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VOLUME XXX, PART I

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1959

PROCEEDINGS

OF THE

Bristol Naturalists' Society

EDITED BY A. J. WILLIS
ASSISTED BY A COMMITTEE

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All matter for inclusion in the next issue of the *Proceedings* should be sent to :—

Dr. A. J. Willis,
Department of Botany,
The University,
Bristol, 8

not later than feb. 28.

Other instructions for authors appear on Contents page.

All Books, Pamphlets, Reports of Proceedings sent by way of exchange, gift or otherwise, and all correspondence relating thereto and to purchases of the Society's publications should be addressed to :—

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Bristol, 6

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Dr. A. F. Devonshire,
59 Falcondale Road,
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VOLUME XXX, PART I, 1959

CONTENTS

	PAGE
Council	2
New Members and Changes of Address	3
Report of Council	6
Report of Entomological Section	6
Hon. Treasurer's Statement of Accounts	7
Report of Botanical Section	8
Report of Geological Section	9
Report of Ornithological Section	10
Report of Junior Section	11
Account of the General Meetings	12
Hon. Librarian's Report	14
Bristol Botany in 1959, by Cecil I. and N. Y. Sandwith	15
Bristol Bird Report, 1959	21
Lepidoptera Notes, Bristol District, 1959, by C. S. H. Blathwayt ..	49
A Revised List of the Lumbricids found in the Bristol District, by H. Davies	51
Gravels below the Flood Plain of the Bristol Avon at Keynsham, by D. T. Donovan	55
Temporary Exposure of Lower Lias at Whitchurch, Bristol, by C. E. Leese and F. S. Ross	67
An Inland Occurrence of the Pointed Snail, by H. W. Bird	69
Hypogeous Fungi of the Bristol District, by Lilian E. Hawker	71

INSTRUCTIONS TO AUTHORS

1. All matter offered for publication in the " PROCEEDINGS " must be sent as directed on p. 2 of cover of current issue.
2. To ensure consideration for inclusion in the next issue, contributions must be received not later than February 28.
3. All copy must be type-written (preferably double-spaced) or in very clear manuscript and, in either case, with good margins.
4. Copy submitted is not returnable and authors are advised to keep a duplicate.
5. At the discretion of the Hon. Editor, contributors may be required to furnish short abstracts of their communications, for printing as summaries.
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1959

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BOTANY, GEOLOGY and ZOOLOGY at the UNIVERSITY OF BRISTOL

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(other than Junior Members)
From 15 April 1959 to 27 April 1960

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The addresses of Junior Members may be had from the Hon. Secretary of the Junior Section.

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	Barbour, Mrs. R. F.	Do.
	Batty, Mrs. K. T.	Steppings, Bay Road, Ladye Bay, Clevedon, Somerset.
	Beguin, Miss P. I. R.	Kington Mead Farm, Thornbury, Nr. Bristol.
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	Brown, Mrs. D. L. M.	102 Nag's Head Hill, Bristol, 5.
	Bryce, Miss J. L.	Sleepy Hollow, Stone Allerton, Axbridge, Somerset.
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	Cottrell, Miss E. V.	39 Broadfield Road, Knowle, Bristol, 4.
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	Wraight, Mrs. G. V.	Do.

REPORT OF COUNCIL
1959

OUR membership continues to increase and now stands at 666, including a Junior Section of 113 ; there are 22 affiliated Societies. Despite this it has been found necessary to increase the rates of subscription.

At the Annual General Meeting the Officers and Members of Council were duly elected with Miss M. H. Rogers as President. Many General and Sectional meetings were as usual held during the year and the Field Section was very active. The Society was able to see the R.S.P.B. films " Highland Birds " and " Island of Birds ". The Annual Dinner, at which there was an attendance of 87, was held on March 13 in the Senior Common Room of the University, by kind permission of its members. The Guest Speaker was Professor R. F. E. W. Peel, M.B.E., M.A.

The deaths of Mr. G. H. Beacham, Mrs. M. A. Wallington, Dr. E. E. Lowe and Mr. M. Sutton were recorded with much regret.

A. C. LEACH, *Hon. Secretary.*

REPORT OF ENTOMOLOGICAL SECTION
1959

AT the 95th Annual Business Meeting held on Tuesday, January 6, 1959, Mr. Norman A. Watkins was re-elected President and Mr. Cecil L. Bell Secretary.

During the year the Section held five indoor meetings and one Field Meeting as follows :

Feb. 3 : Talk by Peter F. Bird, B.Sc., on " Something about Insects ".
Mar. 3 : Film—*Life History of the Monarch Butterfly.*
June 6 : Field Meeting at Burrington Combe.
Oct. 6 : Visit to City Museum to inspect collections.
Nov. 3 : Annual Exhibition.
Dec. 1 : Talk by J. C. Hartley (Bristol University) on " Hoverflies ".

CECIL L. BELL, *Hon. Secretary.*

RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31 DECEMBER, 1959

Dr.

1958 £ s. d.			£ s. d.	£ s. d.	£ s. d.
	To Members' Subscriptions:—				
333 8 0	Full Members	1958	5 0 0		
		1959	338 9 0		
		1960	26 15 0		
				370 4 0	
32 15 0	Household Members	1958	10 0		
		1959	34 0 0		
		1960	3 15 0		
				38 5 0	
40 2 6	Country Members	1958	1 10 0		
		1959	39 3 6		
				40 13 6	
—	Corresponding Members	1960	1 5 0		
				1 5 0	
1 9 6	Associates ("Old")	1959	1 2 0		
				1 2 0	
5 15 6	Associates	1959	6 5 0		
		1960	10 0		
				6 15 0	
27 6 0	Affiliated Societies	1958	1 0 0		
		1959	20 14 0		
				21 14 0	
26 2 6	Juniors	1959	25 17 6		
		1960	15 0		
				26 12 6	
					506 11 0
466 19 0					
1 15 4	,, Profit on dinner			—	
69 19 10	,, Proceedings (covers, etc.)			—	
4 0 0	,, Proceedings (1958 subscriptions)			2 0 0	
1 15 0	,, Publications			2 10 0	
					4 10 0
544 9 2					511 1 0
5 4 0	,, Field Committee surplus over expenses				9 0 6
—	,, Profit on "Highland Birds" meeting				27 4 4
8 19 10	,, Interest on Deposit (Post Office)				7 17 9
558 13 0					555 3 7
	,, Balances:				
	Bank			151 18 4	
	Post Office Savings Bank			200 3 4	
	In hands of Field Committee			25 6 6	
	In hands of Secretary			7 11 8	
352 11 11					384 19 10
£911 4 11					£940 3 5

P. J. M. NETHERCOTT, *Hon. Treasurer.*
13 January, 1960.

Cr.

1958 £ s. d.			£ s. d.	£ s. d.
	By Subscriptions:—			
3 0 0	South Western Naturalists' Union		3 5 0	
9 0 0	Steep Holm Trust		—	
3 2 0	Other Societies		6 4 0	
				9 9 0
211 14 7	,, *Proceedings* (1958)			259 2 0
113 15 9	,, General Printing and Stationery			98 11 9
69 17 7	,, Postages and Telephones			85 6 10
1 0	,, Rent (of Library Room)			1 0
4 3 2	,, Fire Insurance			—
9 11 6	,, Periodicals			8 8 0
—	,, Cataloguing of Library Books			25 0 0
13 6	,, Cheque Books			12 0
—	,, Loss on Dinner			1 1 9
13 13 3	,, Fares and Expenses of Meetings			14 10 6
6 5 0	,, Clerical Assistance and Gratuity			5 5 0
—	,, Addressograph Machine			10 5 0
16 7 9	,, Bookbinding			—
	,, Grants: Botanical		15 0 0	
	Entomological		5 0 0	
	Geological		15 0 0	
	Ornithological		15 0 0	
	Junior		10 0 0	
65 0 0				60 0 0
526 5 1				577 12 10
151 18 4	,, Balances:			
	Bank	279 4 6		
	Less Unpresented Cheque	259 2 0		
			20 2 6	
200 3 4	*Post Office Savings Bank		108 1 1	
—	£200 5% Defence Bonds		200 0 0	
25 6 6	In hands of Field Committee		34 7 0	
7 11 8	In hands of Assistant Secretary		—	
				362 10 7
£911 4 11				£940 3 5

* Including Bookbinding Account £40 1s. 2d.
do. Centenary Reserve £27 4s. 4d.

Audited and found correct,
A. E. BILLETT, *Hon. Auditor,*
18 January, 1960.

REPORT OF BOTANICAL SECTION

1959

AT the Annual Business Meeting held in the Physiology Lecture Room of the University on January 12 the following officers were elected: President, Mr. I. W. Evans ; Secretary and Treasurer, Mr. R. F. Wills ; Committee: Mrs. G. S. Wakefield, Miss A. M. Sampson, Dr. A. F. Devonshire, Mr. F. W. Evens, Mr. J. A. Eatough and Mr. H. F. Howard.

The Wild Plant table at the Bristol Museum has again been much appreciated and owing to the fine summer many plants have been shown. We offer our sincere thanks to Dr. F. S. Wallis and Mr. P. F. Bird of the Museum and to Mrs. G. S. Wakefield, Mr. Ivor Evans, and to all our members who have contributed specimens.

On June 20, a whole day coach trip was taken to the Royal Horticultural Society's Gardens at Wisley. The Bath Natural History Society also ran a coach trip on the same day and we were all met by Mr. R. P. Scase, one of our life members who is on the staff at Wisley. We were shown a wonderful collection of shells from all over the world and also many interesting rare wild flowers from his garden. Afterwards Mr. Scase kindly showed us round the gardens.

During the year the following Winter meetings were held :

Jan. 12 : Annual Business Meeting. Impressions of the vegetation in Rhodesia and the Union of S. Africa. Mrs. H. H. Davis.
Feb. 9 : Succulent Plants. Dr. W. D. Ollis.
Mar. 9 : Rare Plants of the Lizard Peninsula. Dr. L. C. Frost.
Apr. 13 : Summer Field Programme.
Oct. 12 : Members' Evening.
Nov. 9 : Plant Names. Dr. A. F. Devonshire.
Dec. 14 : The British *Sorbus* Species. Dr. E. F. Warburg.

The following field excursions took place during the Spring and Summer under the leadership of those named.

May 2 : Goblin Combe and Wrington Warren. Dr. A. F. Devonshire.
May 30 : Coombe Hay. Mr. H. F. Howard.
June 20 : R.H.S. Gardens, Wisley. Mr. R. F. Wills.
July 4 : Painswick Beacon. Mr. E. P. Bury and Mr. H. F. Webb.
July 18 : Sharpham and Berrow. Mr. I. W. Evans and Mr. P. J. M. Nethercott.
Sept. 12 : Stoney Littleton. Miss C. Groves.

In addition, evening walks were taken as follows :

Abbot's Pool. Miss A. M. Sampson.
Long Ashton. Mr. H. F. Howard.
River Avon at Keynsham. Mr. J. A. Eatough.
Compton Dando. Mr. I. W. Evans.
Clevedon Salt Marshes. Mrs. G. S. Wakefield.

Five indoor meetings in the Botany Lecture Theatre were held on the following dates : May 4, June 1, July 6, July 20 and Sept. 14, when specimens collected on field excursions were brought in for identification. On June 1, Mr. Mann gave a talk illustrated with numerous colour slides on the scenery and plants of the West Indian Islands.

R. F. WILLS, *Hon. Secretary.*

REPORT OF GEOLOGICAL SECTION
1959

AT the Annual Business Meeting held in the Geology Department of the University on January 14, 1960, the following officers were elected: President, Mr. C. E. Leese; Vice-President, Mr. F. S. Ross; Hon. Secretary, Mr. R. G. Payne; Field Secretary, Mr. V. D. Dennison; *Ex-Officio*, Professor W. F. Whittard and President of Students' Geological Society; Committee, Mrs. F. S. Wakefield, Miss L. Carlton, Mr. R. Bradshaw, Dr. M. L. K. Curtis, Mr. A. C. K. Fear, Mr. T. R. Fry, Dr. F. C. Phillips, Dr. R. J. G. Savage, Mr. H. W. Turner, Mr. W. F. Vernon, Mr. D. Vowles.

During 1959 the Committee met twice, on January 8 to make proposals for officers and on February 12 to arrange Summer and Winter programmes. The Annual General Meeting was held on January 15 when reports were read and officers elected; an exhibition meeting followed, at which eight members exhibited geological material.

There were four lecture meetings of the Section during the year:

Feb. 12: Mr. D. Findlay—Geological problems of Soil Survey.
Mar. 5: Prof. T. M. Harris—Flora of the South Wales fissures.
Oct. 22: Dr. W. Campbell-Smith—Meteorites.
Nov. 19: Dr. F. S. Wallis—Rocks and the Archaeologist.

In January, Dr. D. T. Donovan was awarded the Murchison Fund for his work on Mesozoic stratigraphy and palaeontology.

The Section would like to record its thanks to Dr. Scott Simpson for his services to the Section and to the Society, and to congratulate him on his new appointment as Professor of Geology, Exeter University.

At Easter, a highly successful four-day trip to Cornwall was arranged and admirably led by the President, Mr. C. E. Leese. Based on Callington, the party visited many sites ranging geographically from Boscastle to St. Austell. First-class geological material was collected.

There were five Field Meetings during the Summer as follows:—

Apr. 18: Cattybrook; leader Mr. W. Vernon.
May 9: Malvern Hills; leader Dr. B. Leake.
July 4: South Wales; leader Mr. R. Bradshaw.
July 22: Whitchurch; leader Mr. C. E. Leese.
Sept. 26: Yate and Chipping Sodbury; leaders Dr. F. S. Wallis, W. Stock, R. G. Payne.

All lectures were held in the Geology Department of the University, and the Section would like to record its thanks to Professor Whittard and its indebtedness to the University for making the premises freely available for these activities.

R. G. PAYNE, *Hon. Secretary.*

REPORT OF ORNITHOLOGICAL SECTION

1959

"THE WREN
THE WREN
THE KING OF
ALL BIRDS"

AT the 35th Annual Business Meeting in January, Mr. G. E. Clothier, Mr. S. M. Taylor and Miss F. Wareham were re-elected President, Hon. Secretary and Assistant Hon. Secretary, respectively. Miss D. M. Crampton and Messrs. P. J. Chadwick, H. H. Davis, H. W. Neal and G. Sweet were re-elected to the Committee. Mr. G. A. Forrest was elected, and Messrs. B. K. Brooke and M. A. Wright retired by seniority. The Editorial Committee was also re-elected.

During the year the following indoor meetings were held :—

Jan. 14 : Annual Business Meeting and Ornithological Brains Trust.
Feb. 13 : The Story of the Osprey in Britain, by P. E. Brown, Secretary of the R.S.P.B.
Mar. 6 : Annual Field Programme Meeting, 1959, and records of Bird Songs.
Mar. 25 : " Canada's Duck Factories," by Hugh Boyd, Biologist, Wildfowl Trust.
Sept. 30 : " Should the Great Black Woodpecker be on the British List ? " by R. S. R. Fitter.
Oct. 28 : " Eighteen Months on Ascension Island," by Dr. B. Stonehouse.
Nov. 20 : Annual Field Programme Meeting, 1960 ; " The Breeding Population of Mallard in North Somerset," by Hugh Boyd ; Reports on 1959 Fieldwork.
Dec. 4 : R.S.P.B. Films *Reed Warblers* and *Island of Birds*—special meeting, admission by ticket.

Attendance at the first seven meetings averaged 62 ; all 350 tickets for the last meeting were sold, including about 100 at a reduced rate to school pupils.

Three field walks were held in the Spring, to Chew Valley Reservoir, the Saltford area and Leigh Woods. Twenty-one took part in an all-day excursion to Salisbury Plain in May.

The " Fieldwork Review " for 1958—the tenth of the series—was published in March. Its contents included an account of the discovery by Mr. M. A. Wright of a Bridled Tern, the fourth British record and the first for Somerset ; details of an important scheme organised by the Steep Holm Trust Gull Research Station to obtain speedy details of any future " wrecks " of seabirds in the area ; and a report on a co-operative study of the breeding-season Shelduck population on the Bristol shore of the Channel.

Fieldwork in 1959 included a continuation of the Shelduck study, in co-operation with the Wildfowl Trust, which showed some interesting differences from 1958 and yielded new statistics on breeding and mortality. A survey of the Lapwing breeding population on the North Somerset moors in the area was also made, for comparison with one carried out in 1949.

The B.T.O. Nest Record and Ringing Schemes were supported, and members contributed to other nationally sponsored investigations.

S. M. TAYLOR, *Hon. Secretary.*

REPORT OF JUNIOR SECTION

1959

THE Annual General Meeting was held in the Physiology Lecture Theatre on January 23, when the following officers were elected to the Members' Committee :—Nigel Webb (Chairman), Stephanie Sweet (Hon. Secretary), Stephen Chapman, Colin Godman, Timothy Lait, and Jack Read.

During the year nine indoor meetings were held :—

Jan. 2 : New Year Party.
Jan. 16 : " Bats." Dr. David Harrison.
Jan. 23 : Two films—*Reptiles* and *Birds of the River*.
Feb. 27 : " Wild Life in Rhodesia and Cape Province." Mr. H. H. Davis.
Mar. 20 : " Natural History and the Camera." Mr. R. F. Wills.
Sept. 19 : Films, and Questions answered by Mr. Maxwell Knight, O.B.E.
Oct. 3 : Exhibition.
Nov. 6 : "Animals and Birds of East Africa." Prof. R. Milnes Walker.
Dec. 11 : "A Bird Watching Holiday in France," by Timothy Lait and "A Visit to Juniper Hall, Surrey," by Nigel Webb.

The following field excursions were held under the leadership of those named :—

Jan. 18 : Blagdon Reservoir. Mr. H. H. Davis.
Feb. 15 : Chew Reservoir. Michael Edgell and Nigel Webb.
Mar. 7 : Wild Fowl Trust, Slimbridge. Mr. B. King.
Apr. 12 : Durleigh Reservoir and the Quantocks. Miss E. Palmer and Mr. and Mrs. R. F. Wills.
May 8 : Flax Bourton to Cambridge Batch. Mr. G. Sweet and Michael Edgell.
May 24 : Steep Holm. Mr. H. Savory.
June 6 : Gordano Valley. Mr. P. J. M. Nethercott and Mr. B. King.
July 29 : Tickenham Moor. Mr. H. F. Howard.
Aug. 26 : Burrington Combe to Shipham. Mr. V. D. Dennison and Mr. R. G Payne.
Sept. 13 : Bitton to Weston (Bath). Dr. A. F. Devonshire.
Sept. 27 : Portland Bill. Mr. B. King.
Oct. 10 : Brockley Combe. Miss A. E. Bennett and Miss M. Jago.
Oct. 17 : Durleigh Reservoir and Taunton Castle.
Nov. 8 : Kellaway Rocks. Mr. F. Stenhouse Ross and Mr. R. G. Payne.
Dec. 27 : Wild Fowl Trust, Slimbridge. Mr. B. King.

The Chew Valley reservoir was visited on Oct. 24 and Dec. 20, and the Blagdon reservoir on Nov. 22, under the leadership of Mr. B. King. Unfortunately on the visit to Steep Holm on May 24, members were not able to land because of the rough sea.

Mr. P. Bird and Mr. V. D. Dennison were elected to the Advisory Committee to replace Miss M. Jago and Mrs. Morris who resigned. Mrs. R. F. Wills was elected Hon. Secretary in place of Mrs. Rosemary Millard, who has now left Bristol. On her departure a presentation was made in appreciation of her work for the Junior Section.

D. WILLS, *Hon. Secretary, Advisory Committee.*
STEPHANIE SWEET, *Hon. Secretary, Members' Committee.*

ACCOUNT OF THE GENERAL MEETINGS

1959

THE 96th Annual General Meeting was held on Thursday, January 22, when the Officers and Members of Council were duly elected. Miss M. H. Rogers was re-elected as President. On his retirement from the post of Treasurer, Mr. A. H. Peach was thanked for his 20 years of valuable service. Mr. Peach, Mr. Ivor Evans and Mr. C. S. Carlile were elected Honorary Members. There followed a lecture by Dr. R. J. G. Savage on " Oases of the Sahara ", beautifully illustrated by colour slides. He referred especially to the water problem which is gradually becoming more serious.

On February 9 Dr. Alan F. Rogers, medical adviser to the Trans-antarctic expedition, gave us a thrilling account of the journey across Antarctica, illustrated with many colour slides. The tremendous difficulties encountered on land, sea and in the air were most vividly brought home to us. Unfortunately local foggy conditions reduced the number attending.

Professor L. J. Audus of Bedford College, London, came to us on October 1 and described the use he made of his biological training when a prisoner of the Japanese in Indonesia. Under incredible difficulties and with the most primitive materials he and Dr. Alston managed to produce a culture of yeast, which proved invaluable, because as a result of its use the pellagra disease more or less disappeared, and the bad eye conditions got no worse ; however, it did not help with beri-beri. Even this much greatly raised the morale of the prisoners, and it gave to the lecturer an interest that kept him alive.

On October 29 Miss Valerie Finnis from the Waterperry Horticultural College, near Oxford, showed us many colour pictures of Alpines in their natural setting. First she showed them in the Dolomites, then near Champéry in Switzerland. She also showed us pictures of the College and gardens at Waterperry at the close of her very interesting and lively lecture.

On November 28, in the Museum Lecture Theatre, we were told by Mr. and Mrs. J. D. H. Hooper about the work done in " Banding Bats " in Devonshire. The bands are aluminium rings clipped onto the forearm. Most of the pictures shown were of the Greater and Lesser Horseshoe Bat and the film illustrated clearly the small size of cave through which the observers had to crawl. The idea that bats go into complete hibernation is incorrect.

A. C. LEACH, *Hon. Secretary.*

GENERAL FIELD MEETINGS

FOURTEEN general field meetings took place during the year, an increase on last year's record number. An innovation was the holding of two evening coach meetings. These were successful, and were attended by some members who are unable to come to week-end meetings. More evening meetings will be held next year. The meeting to Aberystwyth and Devil's Bridge was probably the longest and most ambitious in the Society's history. In accordance with a resolution of Council, sectional secretaries now attend all meetings of the Field Committee, and it is hoped in this way to minimise clashes between sectional and general field meetings.

A brief summary of the field meetings under the leadership of those named is given below,and a much fuller account is kept in the records of the Field Section.

Jan. 10 :	Arlingham Passage. Mr. H. G. Hockey.
Feb. 15 :	Wick St. Lawrence Wharf. Mr. D. A. Cullen.
Mar. 21 :	Silbury Hill, West Kennett Long Barrow, and Avebury. Mr. D. Grant King, Dr. A. F. Devonshire and Mr. Ivor Evans.
Apr. 25 :	Quantocks : Wind Down and Ruborough Camp. Mr. A. N. Marriage and Mr. H. G. Hockey.
May 23 :	Mendips : Rodney Stoke. Mr. T. H. Payne.
June 13 :	Elan Valley Lakes, Aberystwyth, Rheidol Valley railway and Devil's Bridge. Mr. H. G. Hockey.
June 24 :	Tickenham and Cadbury Camp. Mr. A. C. K. Fear.
June 28 :	Selworthy, Selworthy Beacon and Hurlstone Point. Mr. H. G. Hockey and Dr. A. F. Devonshire.
July 11 :	Lyme Regis and Charmouth. Mr. H. G. Hockey and Mr. Ivor Evans.
July 15 :	Velvet Bottom. Mr. H. F. Flook.
Aug. 15 :	Crook Peak. Miss C. Groves.
Sept. 6 :	Brecon Beacons : Caerfanell valley, Tal-y-Bont reservoir, and the Monmouth canal. Mr. D. A. Cullen.
Sept. 19 :	East Brent, Brent Knoll and South Brent. Mr. Ivor Evans and Mrs. G. S. Wakefield.
Oct. 31 :	Quantocks : Holford and Hodder's Combe. Mr. H. G. Hockey.

A. F. DEVONSHIRE, *Hon. Field Secretary.*

HON. LIBRARIAN'S REPORT

1959

DURING the year, 326 books and periodicals were borrowed by members. Exchange of publications was instituted with the following :—Museum of Comparative Zoology, Harvard University; Polish Academy of Science; Academy of Science of the U.S.S.R.

All the books in the library have been recatalogued and a start has been made on the periodicals.

The Society acknowledges with thanks the gift of several books from various organisations and also a number of Bird Reports from one of our members, Mr. H. H. Davis.

Mr. M. Ackland was appointed Honorary Assistant Librarian in January, 1959.

R. BRADSHAW, *Hon. Librarian.*

BRISTOL BOTANY IN 1959

By Cecil I. and N. Y. Sandwith

THE glorious summer of 1959, lasting from May until October, was succeeded by two wet months and a stormy Christmas season. Plants were dried up early on downs and dunes, but the wild flowers of marshes and streamsides flourished exceedingly. The hot sun brought to flower a wonderful autumn crop of aliens (especially weeds from North America) at Avonmouth Dock, as we record below, and Botanical Society members came from far and near to take their toll of the spoil.

Two field meetings were held in our area, both centred on Wells : the British Bryological Society was there in April, while Dr. A. J. Willis was the leader of the Botanical Society's Whitsun meeting. Reports of both meetings will appear in the publications of the two Societies. The bryologists added several Mosses to the North Somerset list, as well as two Hepatics, *Ptilidium pulcherrimum* and *Nowellia curvifolia* (the latter a sensational discovery by Dr. Willis in Ebbor Gorge).

The Report of the Committee of the City Museum for 1958 states that " the Miller Herbarium, formed during the period 1880–1900 and including many specimens from Somerset, was given by the courtesy of the authorities of Sidcot School." This Herbarium is evidently that of W. F. Miller (1834–1918), who had many records from Mendip in Mr. White's Flora and was a friend of White and David Fry. Among his good finds were *Schoenus* in Max Bog (now gone ?) and *Orchis ustulata* on Wavering Down.

A still more recent accession is the Herbarium of Mr. Ivor W. Evans, which he has presented to the Museum. Mr. Evans tells us that it will occupy a special steel cabinet, and that he is now rearranging it according to the new List of British Vascular Plants. This Herbarium contains a fine series of specimens of Bristol aliens.

The death at Kew of Mr. Ernest Nelmes, on February 5th, 1959, aged 62, is a loss to Bristol and Gloucestershire botany. He sent important records from the Gloucestershire side of the area to Mr. White for the " Bristol Botany " notes after 1920, and his name appears on very many pages of the *Flora of Gloucestershire* for localities contributed in District 5, especially around his native village of Hill. Mr. Nelmes was a world authority on *Cyperaceae*, and he was always pleased to help with the naming of Bristol specimens.

The names of principal contributors are abbreviated as follows :

A.J.W., Dr. A. J. Willis	G.W.G., G. W. Garlick
D.M.S., Dr. D. Munro-Smith	P.J.M.N., P. J. M. Nethercott

Ranunculus Lingua L. Still on Catcott Heath, **S.**, " 6 poor plants, 4 of them flowering ", *J. Cowley* in *Somerset Botany* for 1958, in *Proc. Som. Arch. and Nat. Hist. Soc.* for 1958–59, p. 95. In 1942, we found it also in small quantity in a new station in a rhine on the north side of the railway, north-east of Catcott Burtle.

Rorippa × *sterilis* Airy Shaw. Calcareous stream, Seven Springs, Dodington Park, **G.**, *G.W.G.*

Cardamine flexuosa With. × *pratensis* L. Stone, **G.**, *P. G. Munro-Smith*, det. *D. E. Allen.* The first record for the district of this hybrid.

Dianthus gratianopolitanus Vill. "A hybrid form, approaching *D. plumarius* L.", det. *Miss S. Hooper* at Kew, has been introduced on a rocky slope far from houses at Rookham Hill, Wells, **S.**, where it was first noticed by *Mr. P. Sheasby* and was later studied and compared with native Cheddar forms by *Dr. J. F. Hope-Simpson.*

Lathyrus sylvestris L. Berrow dunes north of the Church, **S.**, first seen in 1958, *J. I. Robbins.*

Sanguisorba officinalis L. Damp field between Tytherington and Stidcot, **G.**, *Miss I. King*, comm. *Dr. D. C. Prowse.*

Sorbus anglica Hedl. Rodney Stoke Wood, **S.**, *J. Northover*, det. *A.J.W.*

Pyracantha coccinea Roem. One bush far from houses in Leigh Woods, **S.**, *P.J.M.N.*

Myriophyllum spicatum L. Eastville Lake, **G.**, not flowering, *D.M.S.*

Callitriche platycarpa Kütz. Drain on Yate Common, **G.**, *G.W.G.*, confirmed by *J. P. Savidge.*

C. intermedia Hoffm. Two of the localities given in *White, Fl.*, pp. 529–530, should be cancelled since the corresponding specimens (labelled *C. hamulata* Kütz.) in White's herbarium at Bristol University are referred by *J. P. Savidge* to *C. obtusangula* Le Gall. These localities are : ditch between Shirehampton and Avonmouth, **G.** (see also *Fl. Glos.*, p. 219), and old coal canal at Midford, **S.**, 1901. It will be noticed that White himself (*Fl.*, l.c.) repeated the same two localities under *C. obtusangula.* We are grateful for this information to *A.J.W.*

Epilobium adenocaulon Hausskn. Leigh Woods ; and Walton-in-Gordano moor, **S.**, *P.J.M.N.*

E. Lamyi F. Schultz. Waste ground, Downend, **G.**, *D.M.S.*, det. *G.M. Ash.* Ivory Hill, Frampton Cotterell, **G.**, *G.W.G.*

E. palustre L. Marshy ground above Lower Farm, Charterhouse-on-Mendip, **S.**, *C.I.S.* and *N.Y.S.*

Œnanthe pimpinelloides L. Abundant in a rough hillside pasture, Harry Stoke, Stoke Gifford, **G.**, *D.M.S.*

Thelycrania sericea (L.) Dandy (*Cornus stolonifera* Michx.). Riverside, Hambrook; and waste ground, Downend, **G.**, *D.M.S.*

Leycesteria formosa Wall. Established at Portishead Camp, **S.**, *P.J.M.N.*

Senecio aquaticus Hill × *Jacobaea* L. Occurs in plenty in a number of fen meadows in the Gordano Valley, **S.**, *A.J.W.*, confirmed by *P. M. Benoit*. See also the delightful paper, " The plant ecology of the Gordano Valley ", by *A. J. Willis* and *R. L. Jefferies*, in *Proc. B.N.S.* 29(5), pp. 469–490 (1959), where reference is made to this hybrid on p. 482.

Armeria maritima (Mill.) Willd. St. George's Wharf, Portbury, **S.**, 1921, *F. Samson* in *Miss I. M. Roper*, ms. in her interleaved copy of *White, Fl.*, and (one small tuft) 1959, *P.J.M.N.* We know of no station for Thrift nearer to the City.

Veronica scutellata L. Marshy ground above Lower Farm, Charterhouse-on-Mendip, **S.**, *C.I.S.* and *N.Y.S.*

Orobanche Hederae Duby. Wall, Frenchay, **G.**, *D.M.S.*

Mentha × *piperita* L. A very interesting series of forms of Peppermint occurs by a stream above Lower Farm, Charterhouse-on-Mendip, **S.**, *C.I.S.* and *N.Y.S.* At least three forms were noted, in distinct clumps, the most striking being the greyish, shaggy forma *hirsuta* (Fraser) R. Graham of var. *piperita*. The two other forms were glabrescent, *viz.* the typical var. *piperita* and the var. *subcordata* Fraser, the latter with very distinct leaves, shorter, much more finely toothed, and rounded or subcordate at the base.

M. × *piperita* L. var. *vulgaris* Sole. Drain by railway, Strawberry Gardens Inn, Yate, **G.**, *G.W.G.*

M. × *gentilis* L. var. *gentilis*. Tip at Hambrook, **G.**, *D.M.S.*

Chenopodium ficifolium Sm. Cultivated ground between Hambrook and Moorend, **G.**, *D.M.S.* Manure heap at Blackford, Wedmore, **S.**, *N.Y.S.*

Ceratophyllum submersum L. Wayside pond, Upper Morton, Thornbury, **G.**, *D.M.S.*

Orchis ustulata L. A single plant in short, limestone turf at Callow Rocks, Sidcot, **S.**, *John Hodgson* (*B.S.B.I. Field Meeting*). This had not been reported from Mendip during this century, although it should still occur in W. F. Miller's station on Wavering Down.

O. praetermissa Druce. Damp hollow near Priddy lead-mines, **S.**, *Dr. J. T. H. Knight*. Compare the record of " *O. latifolia* " from the " Mineries Bog " (*B. W. Tucker*) in *Journ. Bot.* for 1917, p. 188.

Sisyrinchium Bermudiana Mill. Dune-slack at Berrow, **S.**, *B.S.B.I. Field Meeting*, comm. *A.J.W.* It was noted as still at Burnham in *Rep. Bot. Sect., Som. Arch. and Nat. Hist. Soc.* for 1930, and may well have been known there to other observers in the intervening period.

Ornithogalum umbellatum L. Two clumps in a hedgerow near North Wootton, Wells, **S.**, *K. A. Franey.*

Colchicum autumnale L. Lane between Nettlebridge and Ashwick, **S.**, *F. M. Pilkington.*

Juncus compressus Jacq. Further peat moor localities (see " Bristol Botany in 1958 ") are a grassy drove on Ashcott Heath, and two marshy fields on Glastonbury Heath, **S.**, *C.I.S.* and *N.Y.S.*

J. tenuis Willd. Berrow, **S.**, in slack and on edge of salt-marsh, *A.J.W.* Compare H. S. Thompson's record from " Burnham Links ", in *Rep. Bot. Sect., Som. Arch. and Nat. Hist. Soc.* for 1930.

Sparganium minimum Wallr. At the western end of the peat moors on Catcott Heath, **S.**, *D.M.S.*

Acorus Calamus L. Bank of the Avon under Cleeve Wood, Hanham Abbots, **G.**, *P.J.M.N.*

Wolffia arrhiza (L.) Hork. ex Wimm. Rhines on Mark Moor, *Commander R. G. B. Roe*, and on Blackford Moor, **S.**, *N.Y.S.*

Butomus umbellatus L. Bank of the Avon under Cleeve Wood, Hanham Abbots, **G.**, *P.J.M.N.*

Potamogeton coloratus Hornem. Rhine at the Portbury end of the Gordano Valley, **S.**, *P.J.M.N.*

Eleocharis quinqueflora (F. X. Hartmann) Schwarz (*Scirpus pauciflorus* Lightf.). Still at Berrow, **S.**, *G.W.G.* See also *Journ. Bot.* for 1918, p. 83, for a 1915 record of its survival there.

Eriophorum angustifolium Honck. Still at Berrow, **S.**, in slack and on the edge of the salt-marsh, *A.J.W.* An interesting, previously unpublished, station is " bog under Lansdown = Langridge Bottom ", **S.**, 1917, *Miss I. M. Roper*, ms. in her interleaved copy of *White, Fl.*

Carex paniculata L. Still at Berrow, **S.**, in swampy ground among the dunes, *D.M.S.* and *B.S.B.I. Field Meeting.*

Deschampsia caespitosa (L.) Beauv. var. *parviflora* (Thuill.) Coss. et Germ. Hambrook, **G.**, *D.M.S.*, det, *C. E. Hubbard.*

Glyceria declinata Bréb. On a track in Greyfield Wood, Clutton, **S.**, *C.I.S.* and *N.Y.S.*

Azolla filiculoides Lam. Rhine on the Brean side of Lympsham, **S.**, *J. P. M. Brenan.* In three spots on the peat moor near Catcott Burtle, **S.**, *Commander R. G. B. Roe.*

ALIENS. Pride of place must be given to the genus *Amaranthus*, which germinated successfully and revelled in the prolonged heat. The railway tracks and waysides at Avonmouth Dock were thronged with specimens of at least eight taxa. *A. albus* L., *A. viridis* L. (*A. gracilis* Desf.), *A. retroflexus* L. and *A. hybridus* L. and its subspecies *cruentus* (L.) Thell. are relatively well known at Bristol. Far more remarkable has been the appearance during the last three years, scattered about the Dock and some of them in quantity, of no less than four Western North American species of the dioecious group *Acnida*, all now recorded for Britain for the first time: they are *A. tamariscinus* Nutt., ♂ (1957 and 1959, *J. E. Lousley*); *A. tuberculatus* (Moq.) Sauer, ♀ (1958–59, *C.I.S.* and *N.Y.S.*); *A. Palmeri* S. Wats., ♂ and ♀ abundantly (1959, first noticed by *Miss M. McCallum Webster*); and *A. Watsonii* Standl., ♂ and ♀ (1959, first noticed by *D. McClintock* and *N.Y.S.*). The Avonmouth material of *Amaranthus* has been thoroughly studied by *Mr. J. P. M. Brenan*, who has prepared an account of all the species which have occurred in Britain. We are most grateful to Mr. Brenan for his help, also to *Prof. J. D. Sauer*, of the University of Wisconsin, who first identified our 1958 specimen of *A. tuberculatus*.

Collected also at Avonmouth Dock last season, the following species are first records for Bristol: the pantropical Composite, *Flaveria bidentis* (L.) Kze., *sensu lato* as probably including *F. australasica* Hook., found by *Mrs. N. Saunders*, det. *N.Y.S.*; the Pedaliaceous, *Gloxinia*-like weed, *Proboscidea louisianica* (Mill.) Thell., a native of North America, found by *D. McClintock* and *N.Y.S.*; *Polygonum pensylvanicum* L. var. *laevigatum* Fernald, by *C.I.S.* and *N.Y.S.*; the small, prostrate, American Spurge, *Euphorbia serpens* H.B.K., det. *C. C. Townsend*, collected by *Mrs. B. H. S. Russell*; and the grasses, *Chloris virgata* Sw. and *Eleusine indica* (L.) Gaertn., collected and determined by *Miss M. Webster*. Of these, the *Flaveria* and *Euphorbia* are first British records.

The following, also at Avonmouth, are first records for the Dock: *Anoda cristata* (L.) Schl. var. *brachyantha* (Rchb.) Hochr. (*J. E. Lousley*); *Impatiens capensis* Meerb. (*C.I.S.* and *N.Y.S.*); *Bidens aristosa* (Michx.) Britton (previously recorded from Bristol as *Coreopsis aristosa* Michx.), found by *Mrs. P. C. Hall*, det. *C. C. Townsend*; and *Rhagadiolus stellatus* (L.) Willd. var. *edulis* (Gaertn.) DC., found by *Mrs. B. H. S. Russell.*

Other noteworthy, but not new, Avonmouth aliens were *Lathyrus annuus* L. (*Mrs. Russell*), *Galium spurium* L. var. *echinospermum* (Wallr.) Hayek (*Miss Webster*), *Plantago aristata* Michx. (*D. McClintock* and *N.Y.S.*) and *Eragrostis pectinacea* (Michx.) Nees (*Miss Webster*).

Finally, alien records from outside the Port of Bristol area are as follows:

Oxalis corniculata L. var. *microphylla* Hk. fil. Lawn-weed, Downend, **G.**, *D.M.S.*, det. *D. P. Young.*

Potentilla recta L. Channel bank, Sheperdine, **G.**, *Dr. R. W. G. Dennis.* Arable field, Lansdown, Bath, **S.**, 1950, *Miss D. M. Frowde* in Kew Herb. Rubbish by roadside, Winscombe, **S.**, 1916, *Rev. E. Ellman* in *J. W. White*, ms. in his interleaved copy of *White, Fl.*

Tagetes minuta L. Roadside kerb, North Road, Yate, **G.**, *G.W.G.* This species appears regularly at Avonmouth Dock.

Artemisia Absinthium L. Rubbish tip, Frenchay, **G.**, *D.M.S.*

Datura Stramonium L. var. *Tatula* (L.) Torrey. Garden at Nettlebridge, **S.**, *F. M. Pilkington.*

Nicandra physaloides (L.) Gaertn. Garden path, Horse Street, Chipping Sodbury, **G.**, *G.W.G.*

Verbascum Lychnitis L. A plant of the yellow-flowered form on the Channel bank at Redwick, near Passage Halt, **G.**, *H. S. Semple*, comm. *Commander R. G. B. Roe.* This form occurred at Avonmouth in 1932 and 1938, and perhaps later.

Amaranthus hybridus L. subsp. *cruentus* (L.) Thell. Garden at Nailsea, **S.**, 1958-59, *Mrs. F. M. Vance*, det. *J. P. M. Brenan.* The form with green, drooping inflorescence.

Polygonum cuspidatum Sieb. et Zucc. Leigh-on-Mendip and Glastonbury, **S.**, *Dr. J. T. H. Knight.*

Rumex scutatus L. Wall, Backwell West Town, **S.**, 1958, *R. A. Graham, R. M. Harley* and *D. H. Lewis*, see *Proc. Bot. Soc. Brit. Is.*, 3, pt. 3, p. 296 (1959).

Helxine Soleirolii Req. Pavement, Downend, **G.**, *D.M.S.*

Lagarosiphon major (Ridley) Moss. In small quantity in a basin of the Canal at Bath, **S.**, *P.J.M.N.* Native of South Africa, and an aquarist's throw-out (see " Bristol Botany in 1956 " for the record of another alien species of *Hydrocharitaceae*, *Elodea callitrichoides*, in the same Canal at the Dundas Aqueduct). New to the district.

BRISTOL BIRD REPORT

1959

COMPILED BY THE EDITORIAL COMMITTEE OF THE
B.N.S. ORNITHOLOGICAL SECTION

P. J. CHADWICK R. H. POULDING
H. H. DAVIS M. A. WRIGHT

EXCEPT where otherwise stated, records below refer only to 1959, and are followed by the appropriate initials throughout. Observers' names, forming a key to the initials, and a note outlining the area covered, appear later in this introduction. Available space does not permit publication of *all* the many records received. Those not included will, as usual, be filed for future reference.

At the New Grounds White-fronted Geese again reached peak numbers in February (5,000 on 14th), two Lesser White-fronts and a single Red-breasted Goose being frequently seen among them from late January to the middle of March. Other important records for the same locality are of a Sandwich Tern on the Estuary in April, two Avocets on the Estuary in December and, in the same month, a Spotted Crake in the Wildfowl Trust enclosures.

Chew Valley reservoir continues to attract a great variety of bird-life and remains the chief centre for breeding ducks in Somerset. As well as Mallard and Tufted Duck, Shoveler enjoyed a successful season, and broods of Garganey, Gadwall, Pochard and Shelduck were also reported. Here, as at all Bristol reservoirs, the low water level, following a remarkably fine summer, provided abnormal areas of feeding ground for autumn waders—the following, among others, being reported : Turnstone, Black-tailed Godwit, Wood Sandpiper, Spotted Redshank, Little Stint, Temminck's Stint and Curlew Sandpiper. From Chew Valley, also, there are records of Water Pipits (up to 10 or 12) in March and April ; an Osprey in August ; and a party of five Barnacle Geese in December, while the visit of a Whiskered Tern in June gave various observers the surprise opportunity of watching a species seldom seen in Britain and not hitherto met with in Somerset. A Red-necked Grebe was identified at Cheddar reservoir in October and Great Northern Divers were reported from the same place in November-December.

Noteworthy records from other localities include those of a

Little Gull at Weston-super-Mare in April ; a Hoopoe at Almondsbury in April and another at Winterbourne in August ; an Osprey over Steep Holm in September ; a Grey Phalarope feeding along a roadside near Bath in October ; a Waxwing at Shirehampton in November ; and a Hen Harrier at Sand Bay in December. Crossbills, up to 40 or more, visited Clapton-in-Gordano in July, and at least one Lapland Bunting was seen on Brean Down in mid–December.

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The area covered is that part of Gloucestershire (**G**). lying east of the Severn and south of a line from the New Grounds to the County boundary at Tetbury, and Somerset (**S**.) north of the R. Axe and a line from Wells to the County boundary near Frome. For the purpose of this Report the area extends westwards into the Channel and Estuary to include the promontory of Brean Down, and the islands of Steep Holm and the Denny (cf. Sketch Map, *Proc. B.N.S.*, 1947, p. 225).

GREAT NORTHERN DIVER *Gavia immer*

S. Two divers, probably this species, leaving Cheddar res., Nov. 15 (J.A.McG., M.G.W.). Single bird, same place, various dates, Nov. 29–Dec. 18 (R.M.C., J.A.McG., M.G.W. *et al.*).

GREAT CRESTED GREBE *Podiceps cristatus*

G. One on river, Oldbury-upon-Severn, Jan. 18 (J.G., W.A.H.).

S. Highest autumn and winter totals, Cheddar res.—27, Feb. 15 and 25, Dec. 27 (J.A.McG., M.G.W.). At least eight pairs at breeding sites and 23 ads. concentrated near dam, Blagdon, July 30 (W.L.R.). Size of breeding population, Chew Valley res. uncertain : twenty-two pairs located, Apr. 5 (B.K., G.S.) but only thirteen pairs recorded May 3 (B.K.) ; six nests in reed bed, in close proximity to one another, May 23, and 54 ads. in same area of lake on following day (E.G.M.N.).

RED-NECKED GREBE *Podiceps griseigena*

S. One, possibly a first-winter bird, seen at Cheddar res., Oct. 25 by B.K. who has supplied a detailed description.

SLAVONIAN GREBE *Podiceps auritus*

S. One in breeding plumage, Chew Valley res., Mar. 30 (S.I.B.) and one, Blagdon res., Apr. 21 (A.G.D.)—field descriptions received from both observers.

BLACK-NECKED GREBE *Podiceps nigricollis*

S. Several reported from Chew Valley res. : one in breeding plumage, Mar. 29 to May 12 (R.S.H., G.S. *et al.*) ; two in moult and keeping together, June 24 and July 12 (B.K.), and a single bird in winter plumage, several dates, Sept. 6–19 (G.C.B., S.I.B. *et al.*).

LITTLE GREBE *Podiceps ruficollis*

S. Noted frequently at reservoirs. No detailed survey of breeding population made at Chew Valley, but post-breeding season concentrations of 111, Aug. 3 (B.K.) and 147, Sept. 20 (G.S.) were reported. No records from other localities.

GANNET *Sula bassana*

G. Dead ad. on tidewrack, Severn Beach, Oct. 22 (W.A.H., H.W.N., K.B.Y.).

HERON *Ardea cinerea*

S. Brockley Combe heronry now reduced to nineteen occupied nests, May 5 (B.K., P.J.S.). Twenty-seven occupied nests, Uphill, May 7 (W.L.R.) and two, Newton Park, Newton St. Loe, Apr. 12 (R.J.L.).

LITTLE BITTERN *Ixobrychus minutus*

S. Immature bird seen by A.J.C. on R. Avon, Keynsham, Sept. 28, 1958 (cf. *Rep. Somerset Birds*, 1958, p. 9).

BITTERN *Botaurus stellaris*

G. One in Rushy Pen, New Grounds, Nov. 20 (S.T.J.).

S. One disturbed from reeds, bank of R. Avon, Saltford, Oct. 29 (H.G.S. per P.J.S.).

MALLARD *Anas platyrhynchos*

G. Approx. 1,200 on Estuary, New Grounds, mid-Feb. and 1,300–1,400, late August (per H.J.B.). Counts of 110–120, St. George's Park lake, Bristol, mid-Jan. to mid-Feb. and *c.*135, Nov. 15, Dec. 13 (W.J.S.).

S. As usual, peak occurred in late summer/autumn, but numbers at resrs. far greater than in previous years, probably due to drought and low water levels. Most of coastline and all major waters counted on following dates: *c.* 3,175, Sept. 13 (1,330, Blagdon; 1,390, Chew Valley) and *c.*2,375, Oct. 18 (886, Blagdon; 790, Chew Valley) with *c.*1,875, Nov. 15, Dec. 13 (various observers). Potential breeding population, Chew Valley res. of *c.* 100 pairs which produced a minimum of 35 broods (B.K.).

TEAL *Anas crecca*

G. Approx. 200 on Estuary, New Grounds, Jan.–Feb. Increase through August to 220 on 26th but only 65–75 mid-Sept. to late Dec. when large increase occurred—*c.* 1,700, Jan. 3, 1960 (per H.J.B.). Approx. 55, Oldbury-upon-Severn, Jan. 18 (J.G., W.A.H.).

S. Max. counts, Jan.–Mar. of 644, Chew Valley res., Jan. 3 (B.K.) falling to 171, Feb. 15 (G.C.B., S.I.B.); and 123 on coast, R. Yeo to Clevedon, Jan. 11 (P.J.C., M.A.W.). Autumn arrival exceptionally early and unusually large numbers present—total of 872 at resrs. and inland waters, Sept. 13 (576 at Blagdon) increasing to *c.* 2,150, Oct. 18; 1,550, Nov. 15 and *c.* 1,950, Dec. 13 (B.K.B., G.C.B., S.I.B., J.A.McG., M.G.W., P.J.W.).

First-winter bird ringed, Abberton res., Essex, Nov. 9, recovered, Cheddar res., end of month (per B.K.).

GARGANEY *Anas querquedula*

G. Up to six (5♂♂), New Grounds enclosures, Mar. 20–June 4; most seen on any occasion being four males, May 19, 20 (per H.J.B.).

S. Pair, Cheddar res., Mar. 15 (J.A.McG., M.G.W.). Noted, Chew Valley res., Mar. 20 to mid-Sept.: single male, Mar. 20 (S.J.G.B., H.W.N.), five (4♂♂) on 22nd (P.J.C., B.K.) and up to seven, early April (G.S., M.A.W. *et al.*); up to eight (6♂♂) in May (B.K. *et al.*) and seven (at least 4♂♂), June 3 (A.E.B., P.J.C.). Two broods reared, same res. (B.K.). Party of three (1♂) on rhine, Kewstoke, nr. Weston-super-Mare, Mar. 29 (T.B.S.).

GADWALL *Anas strepera*

S Successful breeding again reported, Chew Valley res. (B.K., M.A.W.), where up to 13 adults seen, Jan.–Mar. (R.M.C., M.G.W. *et al.*); eight to ten present, Apr.–July (H.H.D., G.S. *et al.*) and 18, Sept. 13, but only two, Nov. 15 (G.C.B., S.I.B.), when 18 reported from Blagdon res. (B.K.B.). Three records from Cheddar res.: two, Oct. 31 (B.K.); three, Nov. 1 (P.J.C., M.A.W.) and one on 15th (J.A.McG., M.G.W.).

WIGEON *Anas penelope*

G. Totals from New Grounds include: 900, Feb. 12; 740, Nov. 4; 1,200, Nov. 16; and *c.* 950 in early December, increasing to *c.* 3,000 by end of year (H.J.B. *et al.*).

S. The only large numbers reported in early months were from Chew Valley res.—1,170, Jan. 18 (G.C.B., S.I.B.) and *c.* 1,150, Feb. 1 (P.J.C.). Max. res. counts, autumn/winter: 879, Blagdon, Nov. 15, and 921, Dec. 13 (B.K.B.); 111 and 832, Chew Valley, on same dates (G.C.B., S.I.B.); *c.* 350, Cheddar, Nov. 29 and over 200, Dec. 6, but generally less than 50 present (J.A.McG., M.G.W.).

PINTAIL *Anas acuta*

G. Nine, Oldbury-upon-Severn, Jan. 18 (J.G., W.A.H.). Highest totals from New Grounds: 240, Feb. 16, and 150, Dec. 15 (per H.J.B.).

S. Max. of 27, Chew Valley, res., Jan. 3 (B.K.) with up to five in Feb. (M.G.W. *et al.*); pair, same place, Apr. 3 (R.M.C.);

May 3 (B.K.) and single ♂ on 26th (P.J.C.). Numbers in autumn/winter small, less than ten in any locality except Cheddar res. where 35 counted, Nov. 1 (P.J.C., M.A.W.).

SHOVELER *Spatula clypeata*

S. Evidence of passage movement, Chew Valley res., mid-March (cf. also *Report*, 1958, p. 438). Up to 300 present early January falling to 175–200 in February (T.D.H.M. *et al.*); 242, Mar. 8. (B.K.) and 468 on 15th (G.C.B., S.I.B.). Breeding population of *c.* 20 pairs, same res., where at least 9 broods (59 ducklings) located, May–July (P.J.C., B.K.). Autumn counts, Chew Valley: 166, Sept. 27; 127, Nov. 15; 222, Nov. 22; and 324, Dec. 13 (S.I.B., R.S.H., M.A.W. *et al.*). Few present, Blagdon res. in early months but counts returned of 195, Oct. 18, and 180, Nov. 15; only 13, however, Dec. 13 (B.K.B.). Max. of 44, Cheddar res., Nov. 1 (P.J.C., M.A.W.).

RED-CRESTED POCHARD *Netta rufina*

S. Three (1 ♂), Cheddar res., Dec. 9 (W.S.) and one female or immature, Blagdon res. on 27th (W.A.H., T.D.H.M.)—perhaps genuinely wild birds (cf. *Report* 1953, pp. 390–1).

SCAUP *Aythya marila*

S. Single females, Cheddar res., Mar. 8–25 (M.G.W. *et al.*) and Chew Valley res., Mar. 22, Apr. 24, May 12 (W.A.H., B.K.). Autumn/winter occurrences: single female or immature, Cheddar res., Oct. 11–25 (D.A.H. *et al.*) but party of nine there, Oct. 31 (B.K., J.A.McG., M.G.W.) and up to four in Nov. (inc. 2 ♂♂ on 29th) and three in December (various observers). Female, Chew Valley res., Oct. 25 (B.K.).

TUFTED DUCK *Aythya fuligula*

S. Approx. 650–700 in Area, Feb. 15, Mar. 15 (various observers). Influx at Chew Valley res. in early April where numbers increased from *c.* 300, end March to 441, Apr. 5 (B.K.) and 600 on 15th (G.C.B., S.I.B.), falling to *c.* 300 at end of April but then increasing to 570 by May 3 (B.K.). Summer population at this reservoir of some 275 adults but apparently fewer pairs bred successfully—28 or 29 broods located July–August (P.J.C. *et al.*). No evidence of breeding elsewhere. Approx. 700 in Area on Nat. Wildfowl count dates, Nov. 15, Dec. 13: majority at Blagdon (344 and 250) and Chew Valley resrs. (266 and 224) (B.K.B., G.C.B., S.I.B., P.J.W., K.B.Y. *et al.*).

POCHARD *Aythya ferina*

S. Bred successfully, Chew Valley res.—two adult females seen with young (S.I.B., P.J.C., G.S. *et al.*) Largest numbers reported as usual from Cheddar res. where max. of *c.* 1,750 present, Nov. 29 but none there, Dec. 27 (J.A.McG., M.G.W.). Total number in Area reached peak of *c.* 2,000, Dec. 13 (various observers).

GOLDENEYE *Bucephala clangula*

G. One on Estuary, nr. Berkeley, Nov. 8 (J.D.R.V.).

S. Total of 38 at resrs., Jan. 18 (18, Blagdon ; 11, Cheddar ; 9, Chew Valley). Other high counts from Blagdon include : 20, Feb. 22 (G.C.B., S.I.B.) ; 12, Mar. 15 (S.E.C., K.B.Y.) ; and 14 on 28th (T.B.S.) ; while from 27 to 39 noted at dusk, Chew Valley res., Mar. 12–Apr. 5 (S.E.C., B.K.) with max. of 55, Mar. 18 (S.E.C.). Fewer in autumn/winter : total of eleven at resrs., Nov. 15, Dec. 13 (B.K.B., J.A.McG. *et al.*). Coastal record of two off Brean Down, Nov. 8 (E.G.H.).

COMMON SCOTER *Melanitta nigra*

G. Single male on Estuary, New Grounds, Apr. 15, 29 (L.P.A.).

S. One male, Weston Bay, Jan. 15 (E.G.H.) ; five birds, same place, Mar. 8, 16 (E.M.P., T.B.S. *et al.*) and four (3 ♂♂), Apr. 9 (W.L.R.). Female, Cheddar res., Jan. 17 (M.G.W.). Also reported from Chew Valley res. : female, Apr. 5 (B.K., G.S.) and four (3 ♂♂) on 9th (D.G. per J.D.R.V.). Summer records of a male, Sand Bay, June 14, 15 and a pair, July 7 (T.B.S.), while the only autumn/winter occurrences are of a male, Weston Bay, Nov. 15 (B.S.) and three, Dec. 26 (T.B.S.) ; and two on R. Severn, nr. Kingston Seymour, Dec. 13 (P.J.C.).

GOOSANDER *Mergus merganser*

S. Very few reported. Female, Cheddar res., Jan. 18 ; three, same place, Feb. 8, 15 ; two in Mar. ; and a single female, Dec. 9–27 (various observers). Single male, Chew Valley res., Jan. 20 (W.L.R.) and solitary females Jan. 24, 25, Feb. 15 (W.J.S. *et al.*) and again. Nov. 29, Dec. 29 (R.M.C.). Two females, Blagdon res., Feb. 3 (P.N.) and one on 22nd (G.C.B., S.I.B.).

SMEW *Mergus albellus*

S. Reported only from Chew Valley res. in Jan.–Mar. : max. monthly counts of five (2 ♂♂), Jan. 18 (G.L.B.) ; 15 (5 ♂♂), Feb. 15 (G.C.B., S.I.B.) ; and seven (2 ♂♂), Mar. 8 (B.K.). Autumn/winter records of two, Blagdon res., Nov. 8 (D.A.H., T.D.H.M.) ; four, same place, early Dec. (B.K.B. *et al.*) and seven (1 ♂), Dec. 26, 28 (T.B.S.) ; nine, Chew Valley, Dec. 13 (G.C.B., S.I.B.) and up to four at end of month (B.S., M.A.W.) ; four, Cheddar res., Dec. 22 (B.K.).

SHELDUCK *Tadorna tadorna*

G. and **S.** Repeat of 1958 coastal survey (cf. *Report* 1958, p. 441) showed *c.* 520 birds present, mostly paired but many immature, early May. Some 260 ducklings (36 broods) located, of which 200–220 still surviving, July 12 (various observers). Inland breeding records : two females with young, Chew Valley res. (B.K. *et al.*).

EGYPTIAN GOOSE *Alopochen aegyptiacus*

S. One, an unringed bird, Chew Valley res., Dec. 20 (Jnr. Sect.). One, also unringed. reported by B.K. from same res., Apr. 6, 20, 1957. This species, frequently kept in waterfowl collections, is not on the British List, but feral birds have long been known in some parts of the Country (Eds.).

WHITE-FRONTED GOOSE *Anser albifrons albifrons*

G. New Grounds : 1,200 in early Jan. (H.J.B.) but total up to 3,000 on 31st (B.K.) ; subsequent increase to 3,700, Feb. 6 and 5,000 on 14th, but not more than 3,000 at end of month—numbers falling through Mar. to 1,500 on 21st–22nd. when the birds all departed (H.J.B.). Autumn records, same place, of 67 arriving Oct. 1, with sharp increase to 710 on 5th and 860 on 31st ; further increase to 1,500 by mid-Dec., total remaining thus to close of year (H.J.B.) ; 26 flying S.W. over Stapleton, Nov. 28 (H.G.H.).

S. Two, Chew Valley res., Jan. 3 (B.K.) and three on 17th (B.K., G.S.) and 18th (P.J.C., M.A.W.) ; twelve, same place, Feb. 4 (A.G.D.). Three on coast nr. Kingston Seymour, Jan. 11 (P.J.C., B.K.). Party of five, Cheddar res., Oct. 18 (D.A.H., J.A.McG., T.D.H.M. *et al.*). Ten, Chew Valley res.. Dec. 27 (R.M.C.).

GREENLAND WHITE-FRONTED GOOSE *Anser albifrons flavirostris*

G. A ringed bird seen at close quarters, New Grounds, Mar. 14, 16 (number read as Copenhagen 271698) had been marked as a gosling in Jakobshavn district of West Greenland, Aug. 1, 1958 (G.V.T.M.). One, probably different, New Grounds, Apr. 4–13 (M.D.). Five ads., same place, Dec. 15, 16 (H.J.B., P.J.O.).

LESSER WHITE-FRONTED GOOSE *Anser erythropus*

G. Of two ads. at New Grounds, mid-Feb., one remained to 27th or later, and the other was still present, Mar. 21 ; what may have been a third seen with a single White-front (*A. a. flavirostris*), Apr. 4–13 (H.J.B.).

PINK-FOOTED GOOSE *Anser brachyrhynchus*

G. Forty-five still at New Grounds, Jan. 3, of which only one stayed and was noted frequently to Mar. 19 (H.J.B.). First autumn arrivals 22, Oct. 20, with increase to 34 by end of month but total down to 18, early Dec. ; none later (H.J.B.).

BARNACLE GOOSE *Branta leucopsis*

S. One, with a semi-feral Greylag, Blagdon res., Nov. 7 may have been a wild bird ; one, probably the same, Chew Valley res., on following day (K.B.Y.) and again at Blagdon, Dec. 13 (B.K.B.). Party of five, Chew Valley res., Dec. 1 to close of year, were first reported by W.G.F. and subsequently by various observers ; the birds, described by P.J.C. as being unringed and by G.S. as being " very wary ", were evidently wild visitors. First records for the N. Somerset resrs. (Eds.).

CANADA GOOSE *Branta canadensis*

S. One, perhaps genuinely wild, St. George's Wharf (mouth of Avon), June 9 (W.A.H.).

RED-BREASTED GOOSE *Branta ruficollis*

G. An adult, presumably a wild bird, frequently seen among White-fronted Geese at New Grounds, Jan. 24 to Mar. 13 (H.J.B., B.K., P.S. *et al.*).

MUTE SWAN *Cygnus olor*

S. Usual mid-summer gatherings at resrs. with max. of 87, Chew Valley, Aug. 23 (B.K.) and 53, Blagdon, July 30 (W.L.R.). Herd of 70, Cheddar res., Dec. 6 (J.A.McG., M.G.W.) and 53, probably part of same herd, on flood water on nearby Draycott Moor, Dec. 20 (P.J.C., M.A.W.). About 40 wintering on R. Avon, Bath (B.K.). Immature ringed, Chew Valley res., 18/7/57, found dead, North Curry, 27 m. S.W., 4/12/59 (per R.H.P.).

WHOOPER SWAN *Cygnus cygnus*

S. Single record of an adult, Chew Valley res., Jan. 3 (B.K.).

BEWICK'S SWAN *Cygnus columbianus bewickii*

G. Two in W.T. enclosures, New Grounds, Jan. 5–Mar. 21 but six present, Jan. 11; 15, Feb. 3; three on 18th and 10 on 21st (M.D. *et al.*) Family party of four, same place, Nov. 3–Dec. 29 (per H.J.B.).

S. Herd of eight, Blagdon res., Feb. 22, Mar. 11 (G.C.B., S.I.B.).

BUZZARD *Buteo buteo*

G. Reported in breeding season from New Grounds, Wotton-under-Edge, Dursley, Tortworth, Thornbury and Frenchay (various observers).

S. Pair bred successfully within six miles of City boundary (H.H.D.). Other breeding season records from Long Ashton, Clevedon, Hutton, Blagdon, Mendip, Cheddar and Wells (various observers). One disturbed from plateau, Steep Holm, Sept. 5 (Res. Stn.).

HEN HARRIER *Circus cyaneus*

S. Female or immature, Sand Bay, Dec. 2 (R.K.N.).

OSPREY *Pandion haliaëtus*

S. One seen to take a large trout, Chew Valley res., Aug. 2 (P.J.C.); another low over Steep Holm, Sept. 5 (Res. Stn.)—full details received.

HOBBY *Falco subbuteo*

G. Single bird, Iron Acton, June 10 (H.H.D.).

S. One, nr. Clapton-in-Gordano, May 6 (H.H.D.). Two, possibly three, hawking insects, Chew Valley res., May 25 (F.G.H., H.H.); single birds, same place, June 1 (M.A.W.), July 29 (B.K., M.A.W.), Aug. 22 (P.J.C.) and on 23rd (J.A.McG.). One, Charterhouse, May 30 (R.M.C.) and another, Brean Down, Sept. 13 (R.A.).

PEREGRINE *Falco peregrinus*

G. Single birds, New Grounds, Mar. 7 (R.M.C., W.J.S.); St. George, Bristol, on 22nd (G.B.); and Wotton-under-Edge, June 28 (D.B.P.S.).

S. No evidence of breeding although frequently seen at coastal localities. Inland records of single birds: Cheddar Gorge, Jan. 18 (D.A.H., T.D.H.M.), Sept. 19 (D.R.H.); Chew Valley res., Feb. 8 (B.K.); and nr. Crook Peak, Mar. 8 (C.G.).

MERLIN *Falco columbarius*

G. Three New Grounds records: male, Jan. 23 (L.P.A.); female or immature on 31st (B.K.); and a male, Oct. 5 (H.J.B.).

S. A male, Brean Down, Feb. 28 (R.A.)—another, Yeo Estuary, Mar. 27 and Sand Point on 28th (T.B.S.).

KESTREL *Falco tinnunculus*

S. Two flying east over Steep Holm, Oct. 3 (Res. Stn.).

RED-LEGGED PARTRIDGE *Alectoris rufa*

G. One seen to fly out of *Spartina*, Severn Beach, Mar. 15 (P.J.C., I.H.S.).

QUAIL *Coturnix coturnix*

G. One heard, Marshfield, July 2 (R.M.C., B.K.).

S. One calling from field of barley and oats, Failand, June 18 but not heard subsequently (R.H.P.).

WATER RAIL *Rallus aquaticus*

G. One, R. Boyd, Wick, Nov. 15, 16 (D.R.H.). Three in W.T. enclosures, New Grounds, Dec. 27 (G.S.).

S. Immature, Chew Valley res., various dates, Jan.–Mar. (B.K.); heard, same place, May 23 and pair seen, June 14 (E.G.M.N.); single birds noted, Sept.–Oct. (K.B.Y. *et al.*). Again reported from Sand Bay, usually single birds, Jan. and Aug.–Dec. (R.A., T.B.S.) but 12 driven out of *Spartina* by high tide, Nov. 2, and 14, Dec. 3 (T.B.S.). One, Pill, R. Avon, Feb. 16 (J.D.R.V.).

SPOTTED CRAKE *Porzana porzana*

G. Detailed description received of one seen at close range, in W.T. enclosures, New Grounds, Dec. 29 (L.P.A.).

COOT *Fulica atra*

S. Up to *c.* 2,000, Cheddar res., Jan. 18–Feb. 15 but only 400, Mar. 1; *c.* 650, same place, Oct. 11, numbers increasing to *c.* 1,300, Nov. 15 and *c.* 2,500 by end of year (J.A.McG., W.L.R. *et al.*). Counts from other reservoirs: 537, Chew Valley, Jan. 24; 1,000, same res., Mar. 1, and 1,050, Aug. 8 (B.K.); 1,100, Blagdon, Sept. 20 (G.S.) and *c.* 2,000, Nov. 15, 29 (D.A.H., T.D.H.M.).

OYSTERCATCHER *Haematopus ostralegus*

S. Highest counts, Sand Bay, include: 60, Jan. 11 (R.A.); 65, Feb. 23 and Mar. 9 (T.B.S.), and 82, Nov. 8 (R.A.). Winter peak of 140, Weston Bay, Jan. 9, and autumn maximum of 217, Oct. 22 (R.A.). Single bird flying over Blagdon res., July 26 (G.C.B., S.I.B.).

LAPWING *Vanellus vanellus*

G. Approx. 2,000 on Estuary, Purton, Sept. 21 (M.P-S.).

S. Max. autumn res. counts—384, Blagdon, Sept. 20 (G.S.); 400, Cheddar, Oct. 25 (J.A.McG.) and 400, Chew Valley, same date (B.K.).

RINGED PLOVER *Charadrius hiaticula*

G. Over 400 on river, New Grounds, Aug. 15 (M.D.) and 163, nr. Avonmouth, Aug. 18 (W.A.H.).

S. Chew Valley res.: one, May 17 and ten on 20th (P.J.C., M.A.W.); small parties, Aug. 13 to mid-Sept., with largest total of 40, Sept. 2 (M.P-S.); six, Dec. 13 (D.M.C.). Single bird, Cheddar res., Sept. 1, and three, Oct. 11 (J.A.McG.). Peak counts, spring passage, Sand Bay—200, May 19 (R.A.) and 130 on 23rd (T.B.S.); autumn passage totals, same area, include 240, Aug. 15, and 270, Sept. 1 (T.B.S.).

GREY PLOVER *Charadrius squatarola*

G. Severn Estuary: one in breeding plumage, Hill Flats, nr. Sheperdine, May 10 (J.D.R.V.); single birds, same area, Oct. 25, Nov. 8 (W.A.H.) and three, Nov. 1 (T.D.H.M.); seven, Oldbury, Nov. 24 (T.D.H.M.).

S. Numbers, Weston Bay–Sand Bay inclusive: seven, Jan. 7 (W.S.); four, May 21 (T.B.S.); single birds, May 27 and several dates Sept.–Nov. (R.A., T.B.S.). Other coastal records—two, nr. Clevedon, Jan. 11; four, Yeo estuary same date (P.J.C.); two, same locality, May 11, 16, and five on 17th (T.B.S.).

GOLDEN PLOVER *Charadrius apricarius*

G. Up to 30, Thornbury, Jan.–Mar.; *c.* 100, nr. Sheperdine, Jan. 4, Feb. 8, and *c.* 150, Berkeley, Oct. 31 (J.D.R.V.).

S. Notable autumn influx, Blagdon res.—five, Sept. 27 (G.G.C.); 75, Nov. 24 (T.D.H.M.) and 124 on 28th (T.B.S.). Also noted Chew Valley res., where single birds seen Aug. 16, Sept. 26 (R.M.C.); six, Oct. 25 (W.J.S.) and at least 30, Dec. 19 (B.K.). Other inland records—250, Marksbury, Jan. 3 and Mar. 8 (B.K.), and *c.* 100, same area, Nov. 1 (P.J.C., M.A.W.) ; 80, Queen Charlton, Jan. 28 (S.I.B.) and *c.* 100, Lulsgate, Dec. 12 (J.A.McG.). Few coastal records : 31, Woodspring Bay, Jan. 19 (G.S.) ; 73, Weston Bay, Oct. 15 (R.A.) ; *c.* 100, Brean Down, Oct. 28 (R.H.P., M.A.W.) and *c.* 130, Axe Estuary, Nov. 5 (R.A.).

TURNSTONE *Arenaria interpres*

G. Estuarine counts : 52, nr. Oldbury-upon-Severn, Jan. 18 (J.G., W.A.H.) ; seven, New Grounds, May 17 (L.P.A.) ; 30, Sheperdine area, Nov. 7, and *c.* 200, Severn Beach, Nov. 9 and Dec. 24 (J.D.R.V.).

S. Coastal records : five, Yeo Estuary, May 16 (T.B.S.) ; two, Sand Bay, May 19 (R.A.) and single birds, same place, Aug. 4 (T.B.S.), Sept. 4 (R.A.). Four in flight, Woodspring Bay, Sept. 19 (T.B.S.) and two nr. Clevedon on 21st (P.F.). Only reservoir records are of one, Chew Valley, Aug. 2 (J.A.McG.) and three, same place, on 3rd (B.K., G.S.).

JACK SNIPE *Lymnocryptes minimus*

G. One found dead, Durdham Down, Clifton, *c.* Nov. 6 by D.P.—identification confirmed by other observers.

S. Single bird, Blagdon res., Oct. 4 (R.S.H.) and two, Chew Valley res., Oct. 25 (B.K.). Up to twelve in *Spartina*, Sand Bay, Nov.–Dec., where one caught in mist net, Dec. 13 (R.K.N.).

WOODCOCK *Scolopax rusticola*

G. Single birds, Wotton-under-Edge, Jan. 30 (D.B.P.S.) and Hinton, nr. Chipping Sodbury, Oct. 24 (D.A.H.).

S. One disturbed from roadside, Sand Bay, Jan. 18 (R.A.) and one flushed, Westpark Wood, Clapton-in-Gordano, Dec. 26 (H.H.D.).

CURLEW *Numenius arquata*

S. Pair, probably breeding, again reported from Walton moor, nr. Clevedon (R.A.). Heard on moors, Clapton-in-Gordano, various dates in breeding season (H.H.D.). Flock of 15 on pasture, Failand, July 3 (R.H.P.).

WHIMBREL *Numenius phaeopus*

G. Reported in small numbers from Estuary on spring and autumn passage. Twenty-one flying east, Thornbury, May 12 (J.D.R.V.).

S. Noted frequently on coast in late April. Party of 43 flying north, Weston-super-Mare, May 22 (R.A.). One or more remained, Woodspring Bay, June to late July when numbers augmented from 23rd (T.B.S.). Last recorded, Woodspring, Aug. 29 (T.B.S.) and Sand Bay, Aug. 30 (R.A.). Many inland records for May, particularly Nailsea and Tickenham moors where flocks up to 30 seen (W.J.S., S.M.T. *et al.*). One, occasionally two, Chew Valley res., July 31–Aug. 16 (G.C.B., S.I.B., G.G.C. *et al.*).

BLACK-TAILED GODWIT *Limosa limosa*

G. Three, New Grounds, Apr. 5, 11, and up to nine, same place, several dates June. Numerous on return passage with max. counts of sixteen, July 12; 32, Aug. 15; 38, Sept. 18, and fifteen, Nov. 27, (L.P.A., H.J.B., M.D.). Eight, Avonmouth, Sept. 7; six, Oldbury-upon-Severn, Sept. 27, and sixteen, Sheperdine, Nov. 7 (J.D.R.V.).

S. One, St. George's Wharf, nr. Portbury, Feb. 15; five, same area, June 23, and four, Aug. 16 (W.A.H.). Two in grass field, Kenn Moor, Apr. 18 (R.A.). Chew Valley, spring and autumn: eight, Mar. 27 (B.K.); nine, July 26 (P.J.C.); up to five, early Aug. to Sept. 26 (many observers).

BAR-TAILED GODWIT *Limosa lapponica*

G. Up to eight on Estuary, New Grounds, Apr. 29—May 17, and two, Aug. 16 (L.P.A., M.D.). One with Knots, Severn Beach, Sept. 13 (T.D.H.M.).

S. One, nr. Portbury, Sept. 13, Oct. 18 (W.A.H.). Yeo Estuary: four, May 11, and two on 17th; four, Aug. 15 (T.B.S.). One, Sand Bay, Sept. 1, 16 (T.B.S.).

GREEN SANDPIPER *Tringa ochropus*

G. One, New Grounds, Apr. 5; also several dates July, and Aug. 22 (L.P.A., M.D.).

S. Seen in all months except Jan. and May, with exceptional number of coastal occurrences—at least three nr. Portbury, Aug. 16 (W.A.H.); single birds, Portishead, Aug. 17 (A.G.D.) and Kingston Seymour, Sept. 9, Oct. 18 (P.J.C.); one, Woodspring Bay, Feb. 28, Mar. 7 (T.B.S., W.S.) and one, sometimes two, same area, early Aug. to late Nov. (T.B.S.). Sand Bay records include two in flight, June 22, and one, several dates, Aug. to Oct. (T.B.S.). Reservoirs : two, Barrow Gurney, Oct. 18 (W.J.S.) and two, Blagdon, Aug. 16 (K.B.Y.), Sept. 11 (D.A.H., W.A.H.), with single bird on 20th (G.S.) ; one, Chew Valley, Apr. 25 (P.J.C., M.A.W.) is the only spring record but more numerous on return passage from mid-June with max. of 18, July 4 (G.S.) and 20, Aug. 2 (J.A.McG.). Winter record of one, same res., Dec. 24 (R.A.). Single bird, Cheddar res., Sept. 27 to end of Oct. (B.K., J.A.McG. *et al.*).

WOOD SANDPIPER *Tringa glareola*

S. Three, Chew Valley res., July 25 (G.S.) and four on following day (B.K.). Two. occasionally three, same res., late July to Sept. 18 (various observers).

COMMON SANDPIPER *Tringa hypoleucos*

G. Two, Horse Shoe Bend, R. Avon, Feb. 22 (R.H.P.).

S. Two, presumed wintering, Jan.–Mar., Chew Valley res. (B.K., J.A.McG. *et al.*) and two, same res., Dec. 27 (B.S.). Late autumn record of four, Cheddar res., Nov. 8 (D.A.H., T.D.H.M.).

REDSHANK *Tringa totanus*

S. Breeding reported from three localities : ten pairs, Chew Valley res., where four or more pairs reared young, Apr.–June (B.K.) ; two nests found, Clevedon, June 10 (M.P-S.) ; three pairs, evidently with young, Woodspring Bay, June 21 (W.L.R., G.S., T.B.S.).

SPOTTED REDSHANK *Tringa erythropus*

G. Single bird, New Grounds, June 20, 21, and one to three, same locality, various dates, late Aug. to early Dec., with five, Sept. 13 (L.P.A., M.D.).

S. Coastal records include : single birds, Sand Bay, Aug. 9 (R.K.N.) and Woodspring on 29th (T.B.S.) ; two, Uphill, Sept. 11 (R.A.). Reservoirs : up to three, Blagdon, mid-Sept. to end of year (S.I.B., G.G.C., T.D.H.M. *et al.*) ; one, Cheddar, Oct. 18 (B.K., J.A.McG., M.G.W.) ; three, Chew Valley, Aug. 29 (R.M.C.) and single birds, Sept. 9–19 (G.L.B., R.M.C.).

GREENSHANK *Tringa nebularia*

G. Single birds, New Grounds, May 27, July 31 and early Aug. ; five, same place, Aug. 19, Sept. 8, 9 (L.P.A., M.D. *et al.*).

Two, Oldbury-upon-Severn, Sept. 27, Oct. 25 (W.A.H.) ; one, Sheperdine, Sept. 27, Oct. 11 and Nov. 7 (J.D.R.V.).

S. Reported frequently from Blagdon and Chew Valley resrs. between July 11 and Oct. 1 (many observers) : highest counts—four, possibly five, Blagdon, Sept. 6 (W.A.H., T.D.H.M.) and six, or more, Chew Valley, Sept. 15 (R.S.H.). Single birds, Barrow Gurney, Sept. 27 (K.B.Y.) and Cheddar, Oct. 11 (D.A.H., W.A.H., J.A.McG.). Coastal records of single birds, Weston Bay, Aug. 10 (R.A.) ; and Sand Bay, Aug. 23 (T.B.S.), Sept. 8 (R.S.H., T.B.S.) ; also Axe Estuary, Sept. 13 (R.A.) and R. Yeo, Aug. 29, Sept. 19 (T.B.S.).

KNOT *Calidris canuta*

G. Approx. 200, New Passage, Jan. 26 (J.D.R.V.) ; 32 on Estuary, New Grounds, Aug. 30 (L.P.A.) and 62, Severn Beach, Sept. 13 (T.D.H.M.).

S. Frequently seen Weston Bay–Sand Bay area : max. counts of 290, Jan. 31, and 70, Sept. 4 (T.B.S.).

PURPLE SANDPIPER *Calidris maritima*

S. One in flight over rocks, Sand Point, Nov. 14 (T.B.S.) and one amongst other waders, Weston-s-Mare, on 16th (R.A.).

LITTLE STINT *Calidris minuta*

G. Single bird, New Grounds, several dates, Aug.–Sept., and Oct. 25 (M.D.).

S. Two, Cheddar res., Sept. 27 (J.A.McG., M.G.W.) and four, same res., Oct. 18 (B.K., J.A. McG., M.G.W.) ; one, Chew Valley res., Oct. 18 (B.K.).

TEMMINCK'S STINT *Calidris temminckii*

S. One watched at close range, Chew Valley res., Sept. 15 (R.S.H.), and also on 19th by same observer and G.L.B. who have both supplied conclusive field descriptions.

DUNLIN *Calidris alpina*

G. Coastal counts : 1,500, New Passage, Jan. 26, and 2,000 Oldbury-upon-Severn, on 31st (J.D.R.V.) ; 1,300, New Grounds, Aug. 15 (M.D.) and 1,500, Severn Beach, Nov. 9 (J.D.R.V.).

S. Large flocks frequently noted Weston Bay—notable counts include 2,200 ,Jan. 26 ; 1,800, Feb. 9, and 1,200, Nov. 6 (R.A.). Totals of approx. 1,000 recorded, Sand Bay, Jan. 31, May 10 and Aug. 3 (T.B.S.). Many records from resrs., late July to Dec.—largest totals for each res. are : 22, Blagdon, Nov. 24 (T.D.H.M.) ; 107, Chew Valley, Nov. 15 (G.C.B., S.I.B.) ; and six, Cheddar, several dates, Oct.–Nov. (J.A.McG., M.G.W.).

CURLEW SANDPIPER *Calidris testacea*

G. Single birds, New Grounds, Aug. 20–Sept. 3 and Oct. 25 (L.P.A., M.D.).

S. Two, Woodspring Bay, Aug. 4 and one on 5th (T.B.S.). Also noted in small numbers, early Aug. to mid-Sept., Weston Bay–Sand Bay area—total of eight, Sept. 2, 3 (R.A., T.B.S.). Single bird, Chew Valley res., Aug. 13, 31 (D.M.C.).

SANDERLING *Crocethia alba*

G. Unusually high numbers on spring passage, New Grounds —92, June 4 ; 118, June 5, and 60, June 7. Fewer on return passage, early Aug.—max. total of 15 on 4th (L.P.A., M.D.).

S. Seen, Weston Bay–Sand Bay, various dates, May 13–June 5, with max. count of 24, May 22 (R.A., T.B.S.). Two, Woodspring Bay, June 21 (G.S., S.S.) and three, same place, July 12 (T.B.S.). Fifteen, some still in breeding plumage, Weston beach, Aug. 17 (R.A.).

RUFF *Philomachus pugnax*

G. One on Estuary, New Grounds, Feb. 17, and present in small numbers, same area, Aug.–Dec. with max. of seven, Oct. 25 (L.P.A., M.D.).

S. Records for Blagdon res. include : three, Sept. 27 and four, Nov. 7 (G.G.C.). Chew Valley res. : two, Apr. 7 (E.D.O.) ; single birds, June 20 (B.K.) and on 25th (R.M.C.) ; up to six, many dates, July to late Dec. (W.A.H., T.B.S. *et al.*). One with Lapwings, Stoke Moor, Cheddar, Dec. 13 (J.A.McG., M.G.W.). Single birds, Axe Estuary, Sept. 12, 15 (R.A.) and Woodspring Bay, Nov. 8 (T.B.S.).

AVOCET *Recurvirostra avosetta*

G. Two on Estuary, New Grounds, several dates, Dec. 22 to end of year (R.V.C., R.J.P. *et al.*).

GREY PHALAROPE *Phalaropus fulicarius*

S. Adult in winter plumage seen on roadside, Lansdown Hill, nr. Bath, Oct. 15, 16 by H.P.S., who has supplied a detailed description of this very tame bird in an unusual site. Identification confirmed on 16th by two other observers. Although stream 170 yds. away, phalarope remained on short grass bordering road, occasionally flying to the other side. Single birds, Chew Valley, res. Oct. 15 (K.B.S.B., L.W.), and Cheddar res. on 25th (J.A.McG., M.G.W.).

GREAT BLACK-BACKED GULL *Larus marinus*

G. Fifty-two adults, New Grounds, Nov. 1 (B.K.).

LESSER BLACK-BACKED GULL *Larus fuscus graellsii*

S. 185, Chew Valley res., Mar. 26 ; 200 at roost, same place, Nov. 7 (B.K.).

SCANDINAVIAN LESSER BLACK-BACKED GULL *Larus fuscus fuscus*

The following records refer to birds presumably of this race :

G. One in W.T. enclosures, New Grounds, Jan. 10 (B.K.) and two in City docks, Nov. 16 (J.G.H.).

S. Single bird, Cheddar res., Oct. 18 (B.K.).

HERRING GULL *Larus argentatus*

S. Fourth-year bird ringed, Steep Holm, 13/11/55, found dead nr. Longcroft, Stirling, 20/4/58. Roosting again noted, Chew Valley res., but no counts available (B.K.).

LITTLE GULL *Larus minutus*

S. One in first-winter plumage, Weston Bay, Apr. 13 (R.A.).

BLACK-HEADED GULL *Larus ridibundus*

S. Maximum roost count, Chew Valley res., 1,700, Jan. 24 (B.K.). Immature ringed, Selsö, Zealand, Denmark, June 25, found dead nr. Bleadon, July 12 (R.K.N., W.L.R.).

KITTIWAKE *Rissa tridactyla*

S. Single adults found dead, Weston-s-Mare, Feb. 4 (M.L.B.), Sand Bay, Feb. 8 (P.J.C., M.A.W.), Dec. 27 (T.B.S.). Immature, Cheddar res., Aug. 16 (J.A.McG.)—another, Weston-s-Mare on 24th (R.A.).

BLACK TERN *Chlidonias niger*

G. Six, New Grounds, May 17 (L.P.A.).

S. Eleven, Chew Valley res., May 10 (B.K.). Heavy passage noted at resrs., May 23, when over 160 reported—106, Chew Valley (B.K.) and 60–70, Cheddar (W.A.H.) ; 40–45, Chew Valley res., May 25 (W.A.H.) ; 28, same place, May 26 (P.J.C. *et al.*) and two on 27th (B.K.). Very few in autumn : one, Chew Valley res., July 26 (G.C.B., S.I.B.) and up to five, same place, Aug. 16–Sept. 15 (various observers) ; single bird, Cheddar res., Sept. 6 (J.A.McG., M.G.W.) and three, Oct. 11 (J.A.McG.). One, R. Axe, Uphill, Oct. 20 (R.A.).

WHISKERED TERN *Chlidonias hybrida*

S. One flying, and at rest, Chew Valley res., June 24, 25—first seen and identified by H.H. and later by H.H.D., B.K., G.S. and M.A.W. Field notes supplied include : pronounced black cap reaching to nape ; pure white of cheeks extending down throat and blending into grey of underparts ; grey upper-parts and tail (only slightly forked) ; white outer tail feathers and under-tail coverts ; thick, deep crimson bill, and legs same colour. First record for Somerset.

COMMON TERN *Sterna hirundo* ARCTIC TERN *Sterna macrura*

G. New Grounds : single birds reported as *hirundo*, May 4, 12, July 7, 20, 21 ; mixed party of at least 30 moving up-river, May 17 (L.P.A., M.D.)—see below, same date.

S. Spring passage : up to three, Chew Valley res., several dates, May 3–June 25 (various observers) ; 43 moving N.E. off Sand Point, 0850 hrs., May 17 (T.B.S.) ; five, Cheddar res., May 23 (D.A.H., W.A.H.). Autumn passage : one, Yeo Estuary, July 5 (T.B.S.) ; two or three, Chew Valley res., July 26–Aug. 29 (various observers) and one same place, Oct. 25 (B.K.) ; two, *hirundo*, Blagdon res., Oct. 11 (B.C. *et al.*) ; three, Cheddar res., Oct. 11, 18, 25 (J.A.McG.) and one, same place, Nov. 1 (J.A.McG., M.A.W.).

LITTLE TERN *Sterna albifrons*

S. Single bird, Woodspring Bay, June 7 (T.B.S.).

SANDWICH TERN *Sterna sandvicensis*

G. One, New Grounds, Apr. 12 (L.P.A.).

RAZORBILL *Alca torda*

S. Immature swimming off Steep Holm, Aug. 16 (T.B.S.). Dead first-winter bird, Sand Bay, Oct. 29 (T.B.S.).

PUFFIN *Fratercula arctica*

S. Young bird found dead, Weston-s-Mare, Aug. 15 (J.M.L.); another, Sand Bay, Nov. 1 (R.A.).

BARN OWL *Tyto alba*

S. Breeding reported from Backwell (R.O.), and Easton-in-Gordano where fledged young seen, Sept. 2 (P.J.C.). Other breeding season records from Chew Valley res., Kewstoke and Yatton.

LITTLE OWL *Athene noctua*

S. One, Steep Holm, Oct. 3 (Res. Stn.).

SHORT-EARED OWL *Asio flammeus*

S. Single birds, Chew Valley res., Jan. 4 (K.B.Y.) and Weston-s-Mare, Feb. 2 (B.S.). Two over coastal marsh, Clevedon, Feb. 25 (W.S., M.W.) and one nr. Kingston Seymour, Mar. 21 (H.W.N.).

NIGHTJAR *Caprimulgus europaeus*

G. At least three heard, Inglestone Common, Hawkesbury, May 23 (T.D.H.M.). Single bird, Bournstream, Wotton-under-Edge, May 26, and one or two, Michaelwood, nr. Tortworth, various dates, mid-May—mid-July (D.B.P.S.).

SWIFT *Apus apus*

G. and **S.** Early arrivals : one, Bishopsworth and *c.* 25, Chew Valley res., Apr. 25 (P.J.C., M.A.W.). Easterly movement, up to sixty per hour, Sand Point, May 17, 18 (T.B.S.), and similar but more northerly passage, New Grounds, same dates (L.P.A.). A marked northerly passage noted over N.E. outskirts of Bristol in late afternoon, July 29, against light wind, coinciding with main departure from breeding stations, and a small north-westerly movement apparent on following day. After thundery weather the fresh westerly winds changed to light northerly on 29th with significant drop in temperature as a weakening depression moved eastward across southern England. The departure and subsequent movement around the depression was perhaps related to the effects of falling temperature on available food supply (R.H.P.).

KINGFISHER *Alcedo atthis*

G. Pair bred, R. Frome, Stapleton (H.G.H.).

S. Breeding reported from Frome and Wells districts (E.D.O., M.W.). Birds noted in various widely separated localities, and not infrequently on coastal rhines at Sand Bay, Woodspring Bay, Uphill and elsewhere (various observers).

HOOPOE *Upupa epops*

G. One in flight, Almondsbury, Apr. 14 (J.U. per H.H.D.). One on lawn, Winterbourne Park, Aug. 26–29 (L.G.S.) ; observer records that the gardener saw it there a week beforehand.

LESSER SPOTTED WOODPECKER *Dendrocopus minor*

G. Records, all for period Mar.–mid. Sept., from two Bristol localities, Downend (R.H.P.) and St. George (G.B.), and from Blaise Castle Woods, Henbury (W.A.H.) and Slimbridge (M.D.).

S. Breeding season records from Newton Park (Bath), Blagdon, Chew Valley, Whatley (nr. Frome) and Wells (J.A.McG., E.D.O., G.S. *et al.*). Unusual record of one on Brean Down, Sept. 27 (E.G.H.).

WRYNECK *Jynx torquilla*

S. One on a lawn, Backwell, Sept. 18 (R.O. per G.E.C.).

WOODLARK *Lullula arborea*

S. Records, late Mar. to early May, from Loxton Hill and Crook Peak (R.A.) ; Goblin Combe, Cleeve (D.A.H., W.A.H.) and Cheddar (J.A.McG.).

SHORE LARK *Eremophila alpestris*

G. One in ad. plumage seen at ranges down to 20 feet close to Frampton-on-Severn breakwater, Nov. 1, 1958 ; when first noticed the bird was just within the Bristol Area but it subsequently departed northwards (cf. *Rep. North Glos. Nat. Soc.*, 1957–58, p. 11).

SWALLOW *Hirundo rustica*

S. March records of one, Butcombe on 23rd (R.P.G.) and three, Bleadon Level, on 26th (C.M.). Single bird, Sand Point, on late date of Oct. 24 (T.B.S.).

SAND MARTIN *Riparia riparia*

S. About 100, Cheddar res., and similar number, Chew Valley res., Mar 29 (M.G.W.). Drain pipe nesting, at least 14 occupied holes, reported from R. Avon, Bath, where one bird seen to enter end of steel scaffolding tube under railway bridge (H.G.H.). Small nesting colony in wall drain pipes, Pensford (G.B.). A few pairs breeding in river banks nr. Frome, where in absence of natural sand banks the birds seem to rely on Water Vole holes (E.D.O.).

RAVEN *Corvus corax*

G. Cotswold records : one, North Nibley, Jan. 7, and three Feb. 1 ; two nr. Dursley, Mar. 23 and Dec. 17 (D.B.P.S.).

S. One, or a pair, Sand Point and Steep Holm, various dates, but no evidence of breeding (R.A., T.B.S., Res. Stn.). Pair seen frequently, Brean Down, where successful nesting reported (R.A., E.M.P., W.L.R. *et al.*) and four young seen in eyrie, Apr. 4 (K.A.F.). Ads. and two young over Uphill, June 12, were probably Brean Down birds (R.A.).

CARRION CROW *Corvus corone*

S. Unusually large numbers, attracted by deposit of meat offal, congregating in several adjoining fields, Nailsea Moor, early May —count of 270 on 3rd (P.J.C.).

HOODED CROW *Corvus cornix*

S. Single bird on saltings, south side of Axe Estuary, July 12 (R.K.N., W.L.R.) ; seen on north side next day and still there on 15th (R.A.).

BLUE TIT *Parus caeruleus*

S. One found dead, Long Ashton, Dec. 16, had been ringed there five years previously (G.E.C.).

LONG-TAILED TIT *Aegithalos caudatus*

S. An exceptional visitor to bird tables but W.L.R. of Hutton reports " one at my bird table trapped and colour ringed, Feb. 8, and returned on 19th—not seen since."

NUTHATCH *Sitta europaea*

G. Spring record of a bird calling from coping stone of house in Clifton ; also seen perched on television aerial (P.J.C.).

DIPPER *Cinclus cinclus*

S. A juvenile on R. Frome, Sharpstone Mill, nr. Freshford, July 9 (G.S.).

MISTLE THRUSH *Turdus viscivorus*

S. Thirty-one, apparently part of a westerly movement, passing in half-an-hour over Brendon Avenue, Weston-super-Mare, Aug. 23, and 62 moving west, same place, during morning of Sept. 6 (R.A.). One passing Steep Holm, Oct. 4 (Res. Stn.).

FIELDFARE *Turdus pilaris*

S. Five, Spring Gardens, Frome, Sept. 29—a fairly early date (E.D.O.).

SONG THRUSH *Turdus philomelos*

S. Six passing S.E., Steep Holm, Oct. 3 (Res. Stn.).

REDWING *Turdus musicus*

G. What seemed to be a large westerly passage over Bristol, Nov. 1, when birds heard almost continuously, 8–10 p.m.—first at Downend and then over several areas in centre of the City (R.H.P.).

RING OUZEL *Turdus torquatus*

S. One, Crook Peak, Mendip, Mar. 21, and one, perhaps same bird, later in the day (R.A.).

WHEATEAR *Oenanthe oenanthe*

G. and **S.** Spring passage noted from third week of March, coast and inland, in many widely separated localities—some Greenland birds being reported (various observers).

S. Early date : one, Charterhouse, Mendip, Mar. 3 (E.D.O.). Male feeding two fledged young, Wavering Down, Compton Bishop, June 13 (W.L.R.). Autumn passage birds seen to third week in Oct. (B.C., B.K., T.B.S.).

STONECHAT *Saxicola torquata*

S. Breeding or breeding season records : four pairs, Brean Down, Apr. 5 (E.G.H.) and female feeding young, May 16 (R.A.) ; pair, Wavering Down, Compton Bishop, May 20 (R.A.) where on June 13 W.L.R. saw juvenile being fed and T.B.S. saw family party of four. Autumn and winter records of up to six from a number of places including Brean Down, Bleadon, Kewstoke and Easton-in-Gordano (various observers) ; at least nine, Brean Down, Sept. 27 (E.G.H.) and up to a dozen birds (pairs and singles), Chew Valley res., Nov.–Dec. (B.K., E.G.M.N.).

WHINCHAT *Saxicola rubetra*

S. Spring and autumn birds frequently reported from coastal areas but few noted inland (various observers). Breeding or breeding season records from Kenn Moor, Walton Moor, Woodspring Bay, Chew Valley res. and two localities on Mendip (R.A., R.M.C., A.G.D. *et al.*). Two, Steep Holm, Sept. 5 (Res. Stn.).

REDSTART *Phoenicurus phoenicurus*

S. Juvenile caught and ringed, Steep Holm, Oct. 4 (Res. Stn.).

BLACK REDSTART *Phoenicurus ochruros*

S. Immature male, Brean Down, Feb. 1 (P.J.C., M.A.W.) and a female or immature on 21st (E.G.H.) ; young male, same place, Mar. 8 (E.M.P., M.G.W. *et al.*).

NIGHTINGALE *Luscinia megarhynchos*

G. Unusually plentiful in Hawkesbury–Wickwar area where at least 31 singing birds, Inglestone Common and Lower Woods, May 23 (T.D.H.M.).

ROBIN *Erithacus rubecula*

S. Pair feeding young, Steep Holm, July 5 ; up to seven on the island during first week of Oct. (Res. Stn.).

GRASSHOPPER WARBLER *Locustella naevia*

G. Reported, late Apr. to end of May, from many widely scattered localities including Wotton-under-Edge, Lower Kilcott, Damery, Inglestone Common, Michaelwood, Henbury and Filton (various observers).

S. One to three calling, several dates, Apr. 13–July 25, Sand Point, where only once before noted (T.B.S.). Also reported from Backwell Hill, Brean Down, Cleeve, Chew Valley, Winford and Walton Moor (various observers).

BLACKCAP *Sylvia atricapilla*

G. Male in W.T. enclosures, New Grounds, Dec. 29 (E.D.O.).

WHITETHROAT *Sylvia communis*

G. Two or three frequently feeding on ripe blackberries in garden, Downend, July–Aug. (R.H.P.).

LESSER WHITETHROAT *Sylvia curruca*

S. Nests found, Chew Magna and Chewton Keynsham (G.B.), and birds reported from Clevedon, Cheddar, Wick St. Lawrence, Rodney Stoke, Wookey, Wells and elsewhere (various observers).

WILLOW WARBLER *Phylloscopus trochilus*

S. Nest and eggs, four feet off ground in hedge, Compton Dando, June 14 (G.B.).

CHIFFCHAFF *Phylloscopus collybita*

G. One singing, Winterbourne, Dec. 14, and still there on 17th (L.G.S.).

WOOD WARBLER *Phylloscopus sibilatrix*

G. Four singing males, Blaise Castle Woods, Henbury, several dates in May (W.A.H.).

GOLDCREST *Regulus regulus*

G. and **S.** Reported from many localities and in some parts seems to be unusually plentiful (various observers).

S. Five, Steep Holm, Oct. 2 (Res. Stn.).

PIED FLYCATCHER *Muscicapa hypoleuca*

S. Single male, Leigh Woods, in May (R.M.C.). Two, Brean Down, Sept. 10 (R.S.H.).

TREE PIPIT *Anthus trivialis*

S. First spring date : Blagdon, Apr. 3 (A.G.D.). Five or more on Mendip between Rookham and Ebbor Gorge, May 31 (J.A.McG.).

ROCK PIPIT *Anthus spinoletta petrosus*

S. Reservoir records, presumably of this race : one, with three Water Pipits, Chew Valley, Mar. 22 (P.J.C., B.K.) and one, Cheddar, Nov. 15 (G.S.).

WATER PIPIT *Anthus spinoletta spinoletta*

S. Chew Valley res. : again reported—one, Mar. 1, 8 (B.K.) ; three on 22nd (P.J.C., B.K.) ; ten to twelve on 29th and following day (B.K.) and up to ten (perhaps same birds) on two occasions, first half of April (B.K., G.S.). One, same res., Nov. 29, Dec. 27 (R.M.C.) and one Cheddar res., Dec. 28 (B.K.).

GREY WAGTAIL *Motacilla cinerea*

S. Three passing S.E., Steep Holm, Sept. 6, and six passing, same direction, Oct. 3 (Res. Stn.).

YELLOW WAGTAIL *Motacilla flava flavissima*

S. Single bird, Steep Holm, Oct. 3 (Res. Stn.). Late date: four, Barrow Gurney resrs., Oct. 18 (K.B.Y.).

WAXWING *Bombycilla garrulus*

G. One feeding on Cotoneaster berries in garden, Shirehampton, Nov. 14 (C.E.T.—*Bristol Evening Post*, Nov. 28, 1959).

RED-BACKED SHRIKE *Lanius collurio*

S. Male, Kewstoke, on frequent occasions, mid-May to mid-June but no evidence of a female (R.A., T.B.S.). Male nr. Banwell, July 8 (R.K.N.).

HAWFINCH *Coccothraustes coccothraustes*

S. Single birds, Failand, Mar. 8 (R.H.P.) and Cleeve Woods, Apr. 24 (A.G.D.), and a pair, Lodway, nr. Pill, May 2 (K.B.Y.). Three, Leigh Woods, May 11 (P.J.C.) and birds present, Orchardleigh Woods, Frome, mid-July (E.D.O.).

SISKIN *Carduelis spinus*

G. Seen several dates (max. 20) in W.T. enclosures, New Grounds, Oct.–Nov. (L.P.A.). Twenty-four in alders, Golden Valley, Bitton, Dec. 24 (G.B.).

S. Two, Orchardleigh, nr. Frome, Jan. 18 (E.D.O.); party of 17, Blagdon res., Nov. 28 (T.B.S.) and 12, Dec. 26 (R.M.C.). Reported also, up to seven, Oct.–Nov., from Chew Valley, Sand Point and Brean Down (various observers).

LESSER REDPOLL *Carduelis flammea cabaret*

G. Several (max. 5), W.T. enclosures, New Grounds, from mid-Oct. (L.P.A.).

CROSSBILL *Loxia curvirostra*

G. At least a dozen, Westonbirt arboretum, Apr. 19 (C.M.S.) and three or more, Oct. 19 (T.P.W.)

S. Party of nine, others heard, Failand, Mar. 8 (P.J.C., R.H.P.). Frequent, Westpark Wood, Clapton-in-Gordano, from mid-July, being first noted (party of 9 or 10) on 15th but over 40 in conifers on 17th; present in very small numbers, same locality, to late Aug. (H.H.D.). Two, Blagdon res., Nov. 3 (S.G.M.).

CHAFFINCH *Fringilla coelebs*

S. More than 1,500 passing Steep Holm and heading E. toward Brean Down during three hour watch, Oct. 4 (Res. Stn.). Migration noted, Sand Point, various dates, Sept.–Nov.—2,000 counted flying west in 15 mins., Oct. 20, and 1,080 counted on westerly course in similar time on 22nd (T.B.S.). Over 400 flying south-west, Weston Bay, in ten mins., morning of Oct. 23 (R.A.).

CORN BUNTING *Emberiza calandra*

G. Cotswold records from West Littleton (one, Mar. 1, J.R.D.V.); Marshfield (seven, July 2, B.K.); and Leighterton (one, July 28, J.R.D.V.). One in song, Hambrook, nr. Bristol, July 17 (R.H.P.).

S. Single birds, Sand Point, May 10 (T.B.S.) and nr. Saltford, June 28 (B.K.).

CIRL BUNTING *Emberiza cirlus*

G. One singing, Durdham Down, Clifton, May 24 (P.J.M.N.).

S. Noted at all seasons and in widely scattered localities, including Kewstoke, Uphill, Bleadon, Cheddar and Wells.

REED BUNTING *Emberiza schoeniclus*

S. Seventeen pairs counted during circuit of Blagdon res., Apr. 4 (B.K.).

LAPLAND BUNTING *Calcarius lapponicus*

S. One in flight over highest point of Brean Down, Dec. 13, was recognized by the " tickey-tic " and the very frequent " tue " call notes; one, possibly a second bird, seen and heard, same place, half an hour later (E.G.H.).

SNOW BUNTING *Plectrophenax nivalis*

S. Single bird, Brean Down, Jan. 3 (W.L.R.). Numbers varying from 7 to 27, Sand Bay, on frequent occasions, Nov. 18–Dec. 27 (R.A., T.D.H.M., R.K.N. *et al*). One, Blagdon res., Dec. 12 (R.S.H.). Party of eight on coast, Kingston Seymour, Dec. 13 (P.J.C.) and *c.* 30, Brean Down, same date (E.G.H.).

HOUSE SPARROW *Passer domesticus*

S. At least seven arrived with other finches, Steep Holm, Oct. 3, and left in direction of Brean Down (Res. Stn.).

TREE SPARROW *Passer montanus*

S. Usually less frequently noted than in S. Glos. but may be increasing. Breeding reported from Burnett and Chewton Keynsham (G.B.), and one seen, Kenn Moor, in mid-May (P.J.C.). Winter records from Backwell, Barrow Gurney, Saltford, Sand Point, Nailsea and Frome (various observers). Three, Steep Holm, July 9, 11 ; first record for the island (Res. Stn.).

LEPIDOPTERA NOTES BRISTOL DISTRICT, 1959

By C. S. H. Blathwayt

A rather wet early Spring was followed by one of the finest and warmest Summers for many years. In spite of the weather, however, the year was on the whole a disappointing one for both Butterflies and Moths and few interesting migrants were seen.

I am grateful to K. H. Poole (K.H.P.) and G. H. W. Cruttwell (G.H.W.C.) for sending me some records. The following are my own except when otherwise stated.

Colias croceus Fourc. (*edusa* Fabr.) (Common Clouded-yellow). Two seen at Weston on August 1.

Vanessa cardui Linn. (Painted Lady). Several seen at Weston in August and September.

Cerura hermelina Goeze (*bifida* Hubn.) (Poplar Kitten). One at light at Weston, May 26.

Cerura furcula Linn. (Sallow Kitten). A few at light at Shapwick in May. Very common on July 24.

Odontosia carmelita Esp. (Scarce Prominent). One at light at Frome, April 18 (G.H.W.C.).

Leucoma salicis Linn. (White Satin). Several at light at Shapwick, June 12.

Gastropacha quercifolia Linn. (Common Lappet). One at light at Milton, nr. Weston, July 7 (K.H.P.).

Earias clorana Linn. (Cream-bordered Green). Several at light at Shapwick, June 12.

Spilosoma urticae Esp. (Water Ermine). One at light at Shapwick, June 12.

Apatele leporina Linn. (Miller). Common at light at Shapwick, June 12.

Apatele alni Linn. (Alder Dagger). A few at light at Shapwick and Weston in late May.

Agrotis cinerea Hubn. (Light Feathered Rustic). One at light at Milton, nr. Weston, May 12 (K.H.P.).

Agrotis trux Hubn. (*lunigera* Steph.) (Crescent Dart). Fairly common at light at Weston late June to August.

Anaplectoides prasina Fabr. (Green-arches). A few at light at Weston in July.

Apamea ophiogramma Esp. (Double-lobed). One at light at Clevedon, July 17.

Apamea sublustris Esp. (Reddish Light Arches). One at light at Milton, nr. Weston, June 12 (K.H.P.).

Apamea scolopacina Esp. (Slender Brindle). A few at light at Weston in July.

Dasypolia templi Thunb. (Brindled Ochre). A few at light at Weston, September—October.

Oria musculosa Hubn. (Brighton Wainscot). Two at light at Frome, July 18, 24 (G.H.W.C.).

Leucania albipuncta Fabr. (White-point Wainscot). Two at light at Weston on October 6 and 8.

Laphygma exigua Hubn. (Small Mottled Willow). Three at light at Weston, July 12, 24, August 27 and at Milton, nr. Weston, September 9 (K.H.P.).

Cosmia diffinis Linn. (White-spotted Pinion). One at light at Weston on August 3.

Zenobia retusa Linn. (Double Kidney). One at light at Clevedon, July 17.

Parastichtis suspecta Hubn. (Suspected). Common at light at Shapwick, July 24.

Cirrhia gilvago Esp. (Dusky-lemon Sallow). One at light at Weston Sept. 7.

Dasycampa rubiginea Fabr. (Dotted Chestnut). One at light at Clevedon, April 4.

Xylena exsoleta Linn. (Cloudy Sword-grass). One at light at Weston, October 1.

Heliothis peltigera Schiff. (Dark Bordered Straw). Three at light at Weston, July 17, September 14, October 1.

Plusia bractea Fabr. (Gold Spangle). One at light at Weston, July 10.

Tholomiges turfosalis Wocke (Marsh Oblique-barred). Several at light at Shapwick, July 24.

Mysticoptera sexalisata Hubn. (*sexalata* Retz.) (Small Seraphim). Two at light at Shapwick, June 12, July 24.

Calocalpe undulata Linn. (Scallop Shell). One at light at Shapwick, July 24.

Lampropteryx otregiata Metc. (Metcalfe's Carpet). One at light at Shapwick, May 22.

Discoloxia blomeri Curt. (Blomer's Rivulet). A few at light at Weston, May-July.

Nyctosia obstipata Fabr. (*fluviata* Hubn.) (Narrow-barred Carpet). Several at light at Weston, July-September.

Eupithecia valerianata Hubn. (Valerian Pug). Several at light at Shapwick, June 12.

Semiothisa alternaria Hubn. (Sharp Peacock Angle). Common at light at Shapwick, June 12.

Margaronia unionalis Hubn. (Scarce Olive-tree Pearl). Two at light at Weston, October 14, 15.

A REVISED LIST OF THE LUMBRICIDS FOUND IN THE BRISTOL DISTRICT

By H. Davies

A REVISED list of the lumbricid earthworms known from the Bristol area is presented. Since the publication of the former note (Davies, 1951), further species have been added and other locations found. The opportunity has also been taken to revise the nomenclature to correspond with present day views on synonymy.

As in the previous note, no attempt has been made to survey the entire area, collections being made principally in Central Mendip and in the Hanham–Oldland district.

Allolobophora chlorotica (Savigny, 1826). Numerous in gardens, cultivated land and ditches throughout the area. At Knowle, specimens were found coiled and encysted in heavy clay. Sometimes seen in aquatic and septic locations. Both the " green " and the " yellow " forms were commonly found.

A. longa Ude, 1885. Common in gardens and farm land throughout the area.

A. trapezoides (Dugès, 1828). A few specimens were obtained from the Burrington Combe area.

A. tuberculata Eisen, 1874. This species was reported under its synonym *A. arnoldi* Gates, 1952 from Hanham and Oldland Common (Davies, 1954b).

A. turgida Eisen, 1874. Abundant in all localities where collections were made. Found in gardens, cultivated land and in meadows.

Bimastus eiseni (Levinsen, 1884). A single worm of this species was found in the grassy edge of a disused quarry at Hanham.

Dendrobaena mammalis (Savigny, 1826). Small numbers were found in gardens at Hanham and Warmley.

D. subrubicunda (Eisen, 1874). Frequently found in rotting debris, compost heaps and occasionally in habitats contaminated by sewage.

D. rubida (Savigny, 1826). Typical specimens with both spermathecae and tubercula pubertatis were found only at Bathford (Davies, 1951). However, athecal forms and intermediates previously identified as *Bimastus tenuis* were found in some numbers in the Mendip caves and in the vicinity of Chewton

Mendip. In caves, the saturated clay bands in the exposed master joints of the limestone form a typical habitat for both this species and *Eiseniella tetraedra*.

Eisenia foetida (Savigny, 1826). Found abundantly in manure heaps, in recently manured soil and in gardens throughout the entire area. Highly melanic forms were occasionally discovered but no distribution pattern of these forms can be determined.

E. hibernica Friend, 1892. A group of eleven mature specimens was found under saturated vegetable refuse in an Oldland Common garden.

E. rosea (Savigny, 1826) forma *typica*. Small numbers were collected from garden soil.

E. veneta (Rosa) var. *zebra* (Michaelsen, 1902). A single worm was found in a newly cultivated garden at Hanham. The extended ridges of the tubercula pubertatis on this specimen identify it as var. *zebra*. Occurrence of this variety in some numbers in a Welsh locality has been recently recognised (Richards, 1958).

Eiseniella tetraedra (Savigny, 1826) forma *typica*. Frequently found in water-saturated locations throughout the area. Large numbers were found in a waterlogged " cow track " near Bitton.

Lumbricus castaneus (Savigny, 1826). Commonly found, particularly in gardens and in pasture land.

L. festivus (Savigny, 1826). A small number of worms were found in gardens at Hanham and in a ditch at Bitton.

L. rubellus Hoffmeister, 1843. Numerous in gardens and around the grassy margins of cultivated ground.

L. terrestris (Linnaeus, 1758). Very commonly found in gardens and cultivated soil over the entire district.

TAXONOMY

The taxonomy of the genus *Allolobophora* has been greatly confused by synonymy and transposition of specific names in a group of four or five closely related species, sometimes referred to as the " *caliginosa* " complex. Recent work based on the examination of a long series of specimens indicates that *A. caliginosa* (Savigny, 1826) forma *typica* can be referred to *A. turgida* Eisen, 1874. The description of *caliginosa* f. *typica* given in Cernosvitov and Evans (1947, p. 13), with the exception of the tabulated data, is a good precis of this species. Similarly, *A. arnoldi* Gates, 1952 described originally from material found in the Arnold Arboretum in Boston, Massachusetts, and since found in many places including the Bristol area is synonymous with *A. tuberculata* Eisen, 1874 (cf. Gates, 1958, p. 4). *A. trapezoides* (Dugès, 1828), usually given as a forma of *caliginosa*, stands as a separate species and is perhaps synonymous with *A. iowana* Evans, 1948.

Specimens identified in the earlier note as *Bimastus tenuis* (Eisen, 1874) are now identified as *Dendrobaena rubida* (Savigny, 1826). The remarkable similarity between *B. tenuis* and *D. rubida* has been often commented upon and it has been recently concluded (Gates, 1956, p. 44) that *B. tenuis* is in fact an athecal variety of *D. rubida*. It remains to be seen if this will cause the collapse of the genus *Bimastus* which consists solely of species deficient in certain reproductive organs. The only remaining member of the genus found in this area—*Bimastus eiseni*—is so identified although it is expected that it will be moved to another genus when a general revision of the Lumbricidae is made.

Eisenia hibernica Friend, 1892 is given the status of a species and not a forma of the *veneta* group as its morphological differences from *E. veneta* f. *typica* are considerable. Muldal (1952) has shown that even the relatively minor physical differences between f. *typica* and f. *macedonica* of *Eisenia rosea* are associated with a change in the number of chromosomes. There seems, therefore, justification for giving specific status to *hibernica* where much greater differences are involved.

DISCUSSION

From the rather scanty literature on the distribution of earthworms in Great Britain, it is apparent that the species found so far in the Bristol area are typical of those in the southern portion of the country. Of the species which reasonably might have been anticipated, only *Octolasium lacteum* (Örley, 1881) and *Octolasium cyaneum* (Savigny, 1826) have not yet been found.

The only possible candidate in the area for an endemic species is *Dendrobaena mammalis* which has a local but scattered distribution in Great Britain and is known from a few localities in France. However this species has been successful in establishing itself in North America (Davies, 1954) and this colonising ability is circumstantial evidence to support an origin outside of Great Britain. Gates (1958, p. 10) goes so far as to suggest that there are no lumbricids endemic in the British Isles. It is presumed that *Eisenia hibernica* and *Eisenia veneta* var. *zebra* came by the agency of man from Southern Europe, probably Italy, during or since Roman times. All of the remaining species are within the scope of Michaelsen's term " peregrine ", having a worldwide but often local distribution in areas where Europeans have settled.

SUMMARY

Lumbricid earthworms of eighteen species have been found in the Bristol district. None is known to be endemic and only *Dendrobaena mammalis* is considered a possible candidate for an endemic species. Fifteen of the species found are of the widely distributed peregrine forms.

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GRAVELS BELOW THE FLOOD PLAIN OF THE BRISTOL AVON AT KEYNSHAM

By D. T. Donovan

1. INTRODUCTION

A NUMBER of recent borings near Keynsham, Somerset, have provided information as to the river deposits which underlie the flood plain of the Bristol Avon, and the purpose of this paper is to put them on record. There are two sets of borings : the first was carried out on behalf of Messrs. J. S. Fry & Sons, Ltd. near the banks of the river to the south of their factory at Somerdale. The second set was carried out on behalf of the Somerset County Council along the line of the proposed Keynsham by-pass road. A sketch-map of the area is shown in Fig. 1.

In summarising the borehole records I have had to interpret logs made by two separate firms for purposes which were not primarily geological. It has been impossible to avoid some inconsistencies during this process.

2. DESCRIPTION OF SITES

A. **The Somerdale Site** (Site 1)

Trial borings were made here to test the suitability of the site for the installation of a " Ranney " collector. This type of installation consists of a shaft which is sunk into the water-bearing stratum, after which perforated tubes are driven out horizontally into that stratum to tap the water over an area. The object in this case was to obtain water by induced infiltration from sands or gravels underlying the flood plain, should suitable beds exist. It was necessary, therefore, to find out the thickness, porosity and other characters of the prospective aquifer over the area which would be tapped by the perforated tubes, and a pattern of test boreholes was necessary. For technical details of this method, reference may be made to publications by Kazmann (1948, 1949).

The first series of test boreholes was sunk on the left bank of the river north-west of the White Hart Hotel, the location of the bores being shown on Fig. 2. They showed that the surface of the bedrock, which consisted of shales and limestones probably of Rhaetic age, sloped towards the river at an angle of about 6°. A true-scale section through the superficial deposits has been constructed from

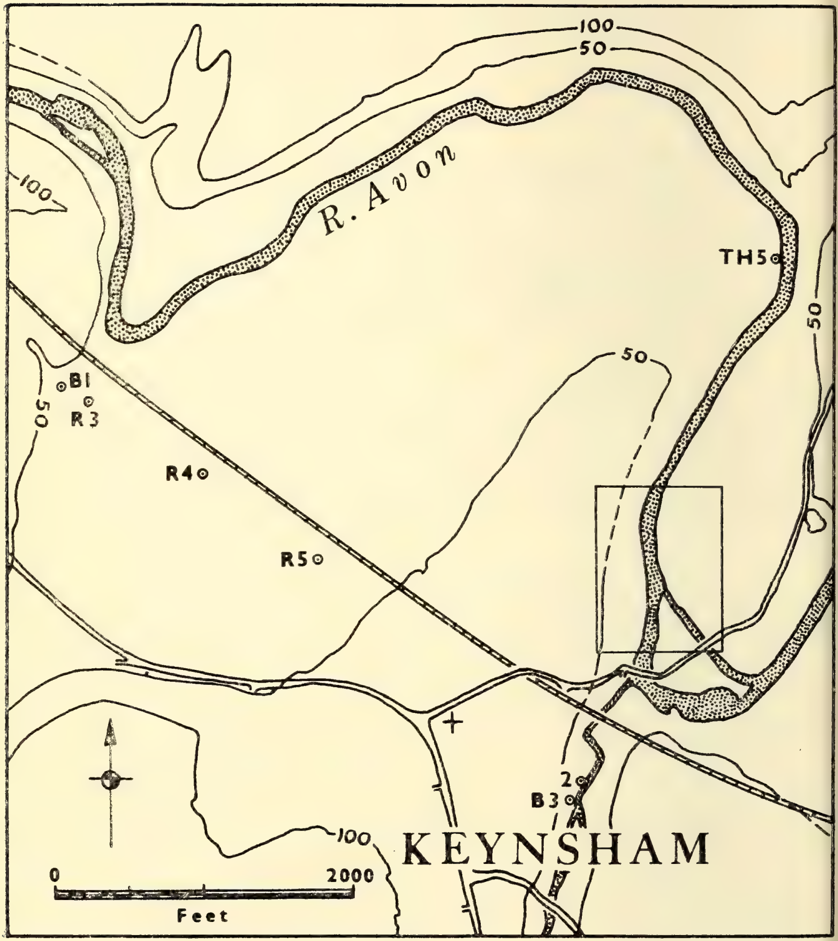
100
50
R. Avon
100
TH5
50
50
B1
R3
50
R4
R5
2
B3
100
KEYNSHAM
0
2000
Feet

FIG. 1. Outline map of the Avon valley at Keynsham, showing the positions of boreholes described in the text. Scale : 4 in. to 1 mile. The small rectangle shows the area included in Fig. 2. (This map is based on O.S. map, 6″ to 1 mile, Somerset sheet VII S.W.)

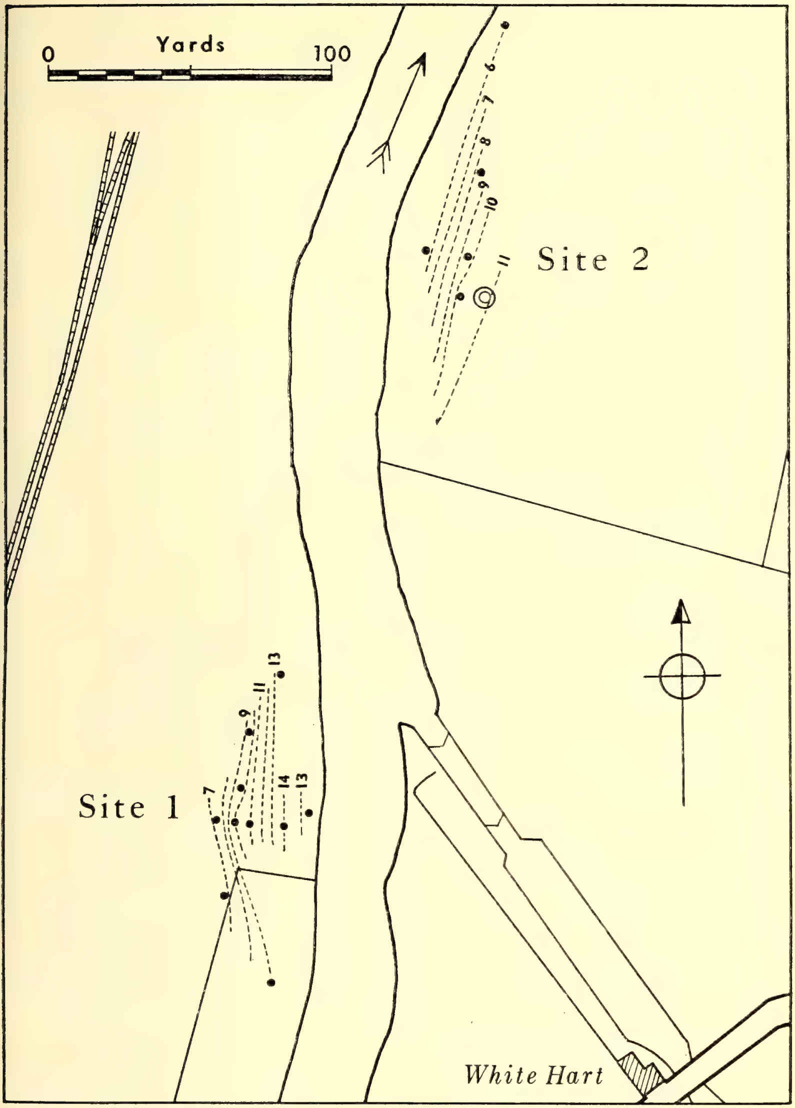
Yards
0
100
6
7
8
9
10
11
Site 2
13
11
9
7
14
13
Site 1
White Hart

FIG. 2. Map of an area between Somerdale and Sydenham Mead (see Fig. 1), showing sites 1 and 2, described in the text. Black discs mark the positions of the boreholes and the open circle the site of the "Ranney" collector subsequently installed. Broken lines are isopachytes of the sand and gravel stratum, at one-foot intervals, with thicknesses in feet.

four of the boreholes (Fig. 3). The lowest deposit (1, Fig. 3) was coarse sand and gravel, with pebbles up to several inches in size. The upper surface of the gravel is approximately level, lying at about 15 feet above O.D. The greatest thickness penetrated was 14 ft. at borehole AE2, about 30 ft. from the river bank. In the hole nearest the river the uppermost four feet of the gravel was silty and contained shells and wood, suggestive of conditions transitional to, or alternating with, those which gave rise to the succeeding deposit. The next deposit (2, Fig. 3) was silt containing much organic matter. Thin peaty seams were present, shells of the river mussel *Unio*, and bone fragments identified as probably of deer. The thickness of this bed varied from 1 ft. at bore AP to 4.5 ft. at AE2. In the hole nearest the river this stratum was not so clearly defined, as remarked above. The highest subdivision (3, Fig. 3) was the river alluvium, generally clayey silt at the bottom, passing up through clay to clayey loam. The surface of the alluvium is at 33 to 35 ft. O.D., its thickness from 14 to 17 ft.

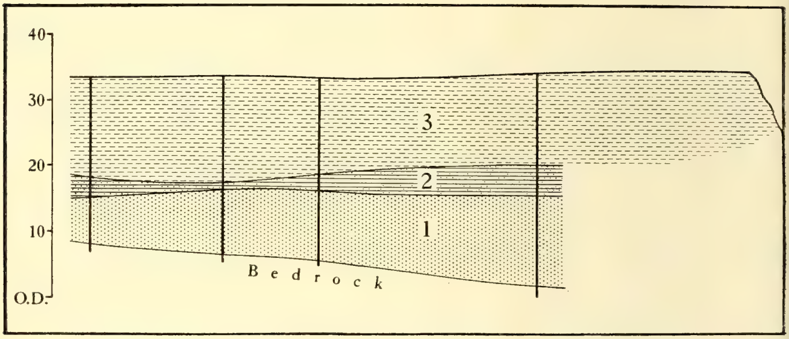

FIG. 3. Vertical section at right angles to the river bank (approximately west-east) at Site No. 1. Thick vertical lines mark boreholes (from left to right) AW1, AP, AE1, AE2. Vertical and horizontal scales the same, the scale on the left showing height in ft. O.D. 1 : Sand and gravel; 2 : Silty deposits with shells ; 3 : Clay and loam (alluvium). The left bank of the river appears at the right-hand side of the diagram.

B. The Sydenham Mead Site (Site 2)

After it had been decided that site 1 was unsuitable for the installation of a " Ranney " collector, a second site was investigated on the opposite side of the river, a little further downstream. This was found to be better and a collector was installed. The pattern of boreholes is shown on Fig. 2. The rock floor consisted of Rhaetic Beds. At the site of the collector, a foot or so of White Lias was present, overlying Cotham Beds. The height of the rock surface varied over the site from 7 to 11 ft. O.D. Resting on it was coarse sand and gravel. The material thrown out from this deposit during the construction of the collector included rounded blocks of Carboniferous Limestone up to 6 in. long, pebbles of golden-brown chert of Upper Greensand type, and flint pebbles, as well as local Jurassic rocks. The thickness of the gravel was only 6 ft. near the river, but away from the river it thickens to a maximum of 11 ft. Approximate isopachyte lines (showing where this stratum is of equal thickness) have been drawn in Fig. 2. The increase in thickness is largely due to the rise of the upper surface of the gravels from 14 ft. O.D. near the river to 18–19 ft. O.D. at distances from 50 to 70 ft. from the bank.

The gravel was overlain by silt with shells; this stratum was not, however, recognised in all the boreholes.[1] At the collector site this stratum took the form of fine sand containing comminuted shells and much plant material—twigs and fragments of leaves, in a blackish preservation, and sizeable pieces of wood, of which one, about 10 in. long, has been identified by Dr. A. J. Willis as almost certainly birch. This organic bed is 2–3 ft. thick.

The alluvium is recorded as clay, which in most boreholes yielded shells, succeeded by clayey loam. Surface levels were 33–35 ft. O.D., maximum thickness about 16 ft.

C. Borehole opposite Londonderry Wharf

A single bore was sunk here (TH 5 on Fig. 1) but was abandoned before it reached bedrock. The surface level is 34 ft. O.D. and the section was :

	ft.	*in.*
Clayey loam, with soil above	5	0
Brown clay	5	0
Brown sand, with shells and some clay	5	0
Grey silt, with shells and wood	5	6
Gravel with " large stones ", bottom not reached . .	3	0

The upper surface of the gravel lies at about 13.5 ft. O.D., the overlying deposits being thicker than at the Sydenham Mead site.

D. The Keynsham Hams boreholes

Four boreholes were sunk along a line a short distance south of the railway on behalf of the Somerset County Council (B1, R3 to R5, Fig. 1). The detailed records follow :

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[1] The writer did not see the material brought up from the trial bores at this site, and the account is based on Messrs. Ranney's records.

B1. Surface level 35.0 ft. O.D.

	ft.	in.
Red-brown silty clay	2	0
Light-brown sandy and silty clay, with some coarse gravel in the upper 4 ft.	5	0
Red-brown clayey sand and gravel	2	0
Angular fragments of sandstone	1	0
Red-brown silty clay with a few fragments of sandstone ..	3	0
Brown, sandy silt, with coarse sand and gravel. Angular fragments of sandstone at the top	6	6
Yellowish, silty sand and gravel, bottom not reached ..	1	0

Bedrock was not reached at this borehole.

R3. Surface level 29.0 ft. O.D.

	ft.	in.
Light-brown, slightly silty clay, with a few small fragments of sandstone	10	0
Light-brown, clayey, silty sand, with angular gravel ..	3	0
Fine and medium sand, and gravel, with a little silt, bottom not reached	7	0

Bedrock was not reached in this borehole.

R4. Surface level 30.5 ft. O.D.

	ft.	in.
Light-brown clay	7	6
Grey and red, silty and sandy clay, and gravel. Peaty material at the top	1	6
Yellowish-brown gravel and silty sand, in part clayey, bottom not reached	1	0

Bedrock was not reached in this borehole.

R5. Surface level 30.0 ft. O.D.

	ft.	in.
Brown, very sandy and silty clay, with pebbles	4	0
Yellowish-brown sand and gravel, slightly silty and clayey in parts	16	0
Stiff, grey clay ; probably Rhaetic or Lower Lias, bottom not reached	2	0

The sand and gravel rested on bedrock at 10 ft. O.D.

All bores penetrated gravel, the upper surface of which is lowest at R3 (19 ft. O.D.) and rises on either side to 26 ft. at R5, and to 22 ft. at B1. At R5 there was 16 ft. of gravel, the greatest thickness penetrated by any of the Keynsham boreholes.

Granulometric curves for samples of the gravel from B1, R3 and R5 are shown in Fig. 4, and are discussed on page 63.

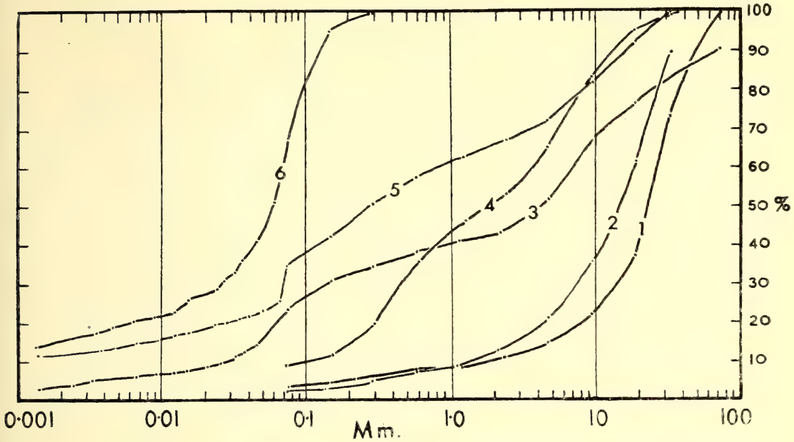

FIG. 4. Particle-size distribution curves for some of the sediments at Keynsham, based on analyses by G.K.N. Reinforcements Ltd., Soil Mechanics Laboratory. Particle size in mm. is plotted on a logarithmic scale horizontally, and cumulative percentages vertically. The dots represent the experimentally determined points. The samples were from the following boreholes :—1, from B3, sand and gravel 4 ft. above bedrock ; 2 and 5, from R3, 2 from the sand and gravel at a depth of 15 ft., 5 from the top of the silty sand with angular gravel, depth 11 ft. ; 3, from the silt with sand and gravel in B1, depth 16 ft. ; 4, from sand and gravel in R5, depth 6½ ft. ; 6, from the alluvium at B3, depth 3 ft.

In B1, which was situated only about 150 ft. from the present outcrop of the Pennant Sandstone, the intercalated beds with angular sandstone fragments are interpreted as scree material. Angular fragments are also present at one level in R3, 210 ft. further from the outcrop.

The peaty material characteristic of the middle division at Somerdale and Sydenham Mead was reported only from R4, beneath clay which is presumably the alluvium. The latter is also recognisable as the top layer at R3, but is not well differentiated at B1 and R5, near the edges of the flood plain.

E. Boreholes near the River Chew

The Chew is tributary to the Avon at Keynsham. About 900 ft. upstream from the confluence two boreholes in the flood plain gave useful information. Both were on the left bank of the river and the ground level is about 33 ft. O.D. The more northerly of the two (2, Fig. 1) was made about 1946 and was not recorded in great detail. It showed 20 ft. of " brown sand " overlying 5 ft. of " river gravel ", which rested on bedrock (" White Lias rock ") at 8 ft. O.D.

The second bore (B3) revealed the following section :

	ft.	*in.*
Reddish-brown, slightly clayey, silty fine sand, and topsoil	7	0
Brown clayey silt, sandy in parts, with thin peat layers ..	4	0
Poorly graded, angular gravel, with slightly silty, medium and coarse sand	7	0
(Grey, silty, shaly clay, probably Rhaetic in age)		

The surface of bedrock is at 15 ft. O.D. and it is noteworthy that the whole of the gravel in this section lies above the top of the gravel as recorded in bore No. 2. The three subdivisions correspond well with the succession at the Somerdale site.

3. COMPARISON WITH OTHER AREAS

A. Bath

It is clear from a number of well records summarised by Richardson (1928, pp. 202–208) that gravel deposits overlie bedrock, and underlie the alluvium, in the Avon flood plain at Bath. Most of the records are inadequate and levels are usually wanting. More informative are two records originally published by Charles Moore (1870, pp. 43, 44). The following section at the site of the Grand Pump Room Hotel[1] is summarised from Moore's paper :—

	ft.	*in.*
Post-Roman accumulation	12	0
Fresh water clays with abundant freshwater and land shells, and seeds	8	0
Gravel	4	0
(Bedrock : Blue Lias clays and limestones)		

The surface level here is about 80 ft. and the base of the gravel about 56 ft. O.D.[2] This section is on the right bank of the river, about 1,100 ft. from the present bank. On the left bank, the following section was exposed in Pulteney Road :

	ft.	*in.*	*ft. O.D.*
Yellow or mottled brickearth	12	0	70
Various very finely laminated clays with fresh water and land shells, and vegetable remains ..	7	0	
Black band of vegetable matter with numerous seeds		4	
Bed of gravel		9	
Blue marl		4	
Light coloured fine sand		4	
Mammal drift gravels	12	0	49
(Bedrock : Lower Lias clays.)			37

[1] At the time of writing being demolished. Moore's paper, copied by Richardson, places the section at the Royal Hotel opposite the W.R. station, but in my copy of the paper " Royal " has been amended to " Grand Pump Room " in Moore's handwriting.

[2] Levels of this and the following section have been estimated from the Ordnance Survey plans and are approximate.

Approximate levels are given in the right hand column. Moore's further remarks on the sections will be discussed below (p. 64).

B. Bristol

Sutcliffe (1822, p. 8) recorded the presence of gravel " in the alluvium of the Avon between High-street and Redcliff-hill " at a depth of 40 ft., *i.e.* about 10 ft. below O.D. Richardson (1930, pp. 229, 231) recorded two borings at Georges' Brewery, showing 7 ft. of gravel resting on Trias at a level of 4 ft. below O.D., and one at Bathurst Wharf in which 6 ft. of " clay and gravel " overlie Trias at 14 ft. below O.D., and are succeeded by 36 ft. of blue clay.

At Broadmead, Fry (1952, p. 273) recorded a temporary section which may be summarised as follows :

	ft.	*in.*
Made ground	3	6
Marsh clay, with land shells and rootlets	4	0
Estuarine clay	19	6
River gravel, with pebbles of Carboniferous and Jurassic rocks	4	0

The surface level estimated from the Ordnance Survey 1/2500 plan is about 27 ft. O.D., so that the base of the gravel was about 4 ft. below O.D.

4. GENERAL ACCOUNT AND INTERPRETATION

The new information, together with earlier records, suggests that at Bath, Keynsham and Bristol the deposits underlying the present flood plain of the Bristol Avon fall into three principal groups : (1) Gravel and coarse sand, resting on the rock floor of the valley ; (2) Clay or marl, silt and sand with much plant debris, peat and shells ; (3) Clay, loam and silt of brownish and red-brown colour—the alluvium of the geological maps. They clearly indicate three successive, different types of régime in the valley.

1. The gravels are noteworthy for the size of some of the pebbles. Well-rounded blocks of Carboniferous Limestone and of Upper Greensand chert up to about 6 in. long were thrown out of the excavation for the " Ranney " collector at Sydenham Mead, and smaller pebbles of these and various other rocks, including flint, were common. The matrix was mainly coarse sand, but sometimes finer material was present. In Fig. 4 curves 1–4 represent the grain-size distribution of samples of these deposits. In two of the samples (curves 1, 2) less than 10% of the material is smaller than 1 mm., and about half consisted of small pebbles (1 cm. to 5 cm.). In the other two samples (curves 3, 4) there is a greater admixture of finer material, but still a significant proportion of coarse.

In attempting to account for the accumulation of the gravels, we may first dispose of the possibility that the gradient of the river was significantly different from its present value. Borings which have reached bedrock at Bath, Keynsham and Bristol show that the surface on which the gravels rest has substantially the same average gradient as the present river ; lowest values are 37 ft. at Bath, 2.5 ft. above O.D. at Keynsham, and 39.3 ft. below O.D. at the Hotwells Tunnel beneath the Avon just above the mouth of the Clifton Gorge.[1]

The transporting power necessary to move the constituents of the gravels must, therefore, have been provided by a greater volume of flow than is normal at the present day. The fact that such debris was available leads us to infer an incomplete soil cover, and this in itself would cause more rapid run-off and possibly a higher percentage of run-off. A further factor must be sought, however, either in periodic heavier precipitation, or in concentration of the run-off due to precipitation as snow and rapid seasonal melting.

2. The next series of deposits clearly indicates marshy conditions in the valley floor. Referring to the deposits at Pulteney Road, noted above, Moore (1870, p. 45) wrote :

> " The thin laminae into which these shelly marls are divided, the enormous number of the shells of all stages of growth they contain, point to a quiescent state of the water, and further indicate a lengthened period for their accumulation, during the whole of which the basin must have been occupied by a fresh water river or lake. The great delicacy of many of the shells proves that they could not have been brought from a distance. Seeds of the fresh water *Chara* are abundant, fresh water crustaceans of the order *Entomostraca* of several species, and occasionally, though not in good condition, the elytra of insects. The land shells found with them have been brought down from the adjoining hills during seasons of flood."

Similar conditions may be inferred from the alternating silts and peats of the Somerdale and Sydenham Mead sites. It is suggested that the valley floor was dammed below Bath, and again below Keynsham ; a likely site for the second barrier would be in the narrow gorge at Hanham. The barriers could have been formed by the underlying gravels, for the borings show that their upper surface is not level, and doubtless they were banked up in places. Alternatively, barriers could have been formed by solifluction deposits or landslips accumulating at the valley bottom.

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[1] The cross-section of the rock floor of the river is known from a series of 19 boreholes made preparatory to the driving of the tunnel. I am indebted to the Bristol Waterworks Company for facilities to examine the records.

During the deposition of the silts and peats the maximum flow of the river must have been much less than during the deposition of the gravel. Snowfall was therefore absent, and rainfall may have been well distributed throughout the year.

3. The alluvium at the majority of boreholes was recorded as clay grade material. At B3, in the Chew Valley, it was coarser (curve 6, Fig. 4) about half the material being between 0.05 and 0.30 mm., the remainder silt and clay. The alluvium is taken to have been built up under conditions broadly similar to those of the present day.

5. CORRELATION

Much more work on the river deposits of the Bristol Avon valley will be necessary before the sequence here described can be seen in its proper perspective. The gravels may be tentatively correlated with the beds of gravel and sand which rest on bedrock (Trias marls) at a maximum depth of about 35 ft. below O.D. in the eastern approach cutting to the Severn Tunnel (Richardson, 1887, folding sections) ; these beds resemble the Keynsham gravels in the absence of clay and silt. The surface of the gravels at Severn Tunnel lies approximately at Ordnance Datum, and is overlain by " silt or muddy sand ", capped by a layer of black peat. These gravels were tentatively referred to the Worcester Terrace of the Severn by Wills (1938, p. 208). Since aggradation in an estuary builds up to high tide level (e.g. Zeuner, 1959, p. 161), the sea-level during Worcester Terrace times must have been lower than it is today by at least 20 ft. The Worcester aggradation was correlated with the Newer Drift of Wales by Wills (1938, p. 232), and Zeuner (1959, p. 169) referred this glacial advance to the second phase of the Last Glaciation. If these correlations are correct, the Worcester Terrace and the Keynsham gravels may correspond to Zeuner's " Ponders End Aggradation ", which filled the second buried channel of the Thames.

The correlation of the beds above the gravel will not be discussed at length here. Dr. M. P. Kerney has suggested to me in correspondence that certain elements in the molluscan fauna recorded by Moore (*op. cit.* p. 46) from the shelly marls above the gravel at Bath indicate a fairly late date in the " Post-Glacial " ; in particular, *Pomatias* [*Cyclostoma*] *elegans* and *Azeca goodalli* [*tridens*] did not reach England before pollen zone V, in the Boreal Phase. This does not, of course, necessarily apply to the deposits above the gravels at Keynsham, which could be earlier ; indeed, some of the sections suggest an intimate connection between the gravels below and the silty and peaty beds above. Peats are known in the fillings of the buried channels of the Thames, but no samples for analysis and comparison were available from the Keynsham sites.

The aggradation of the present-day alluvium may be provisionally correlated with the Tilbury Stage of the Thames, filled with post-glacial alluvium (Zeuner, 1959, pp. 167–8).

6. ACKNOWLEDGMENTS

I am indebted to Messrs. J. S. Fry & Sons, Ltd., Ranney Method Water Supplies Ltd., the Somerset County Surveyor and G.K.N. Reinforcements Ltd. for providing me with information, and allowing me to publish it.

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TEMPORARY EXPOSURE OF LOWER LIAS AT WHITCHURCH, BRISTOL

By C. E. Leese and F. S. Ross

THE site of the exposures (National Grid reference ST 62/69) is the housing estate located to the north of Stockwood Lane and east of the Bristol–Frome railway. Sturminster Road runs through the estate. It is now covered with houses and the fossils listed below were collected during building operations.

Faulting with a northerly trend has dropped the Jurassic rocks into the Triassic and has repeated readily identifiable beds such as Cotham Marble and White Lias. Bulldozing at the time of collection had obscured any measurable sections, although the Trias was seen in contact with the Lower Lias on the fault plane.

REPTILIA

Ichthyosaurus sp. (several detached vertebrae).

CEPHALOPODA

Metophioceras aff. *caesar* Reynès.

Metophioceras aff. *rouvillei* Reynès.

Metophioceras rougemonti Reynès.

Schlotheimia similis Spath.

Schlotheimia pseudomoreana Spath.

Schlotheimia lymensis (Spath).

Waehneroceras aff. *curviornatum* (Waehner).

Waehneroceras megastoma (Gümbel).

Laqueoceras laqueus (Quenstedt).

Alsatites liasicus (d'Orbigny).

Caloceras johnstoni (J. de C. Sowerby).

Psiloceras bristoviensis Donovan.

LAMELLIBRANCHIA

Lima gigantea (J. Sowerby).
Lima (*Ctenoides*) *succincta* (Schlotheim).
Lima (*Radula*) *hettangiensis* (Terquem).
Astarte consobrina Chapuis & Dewalque.
Cardinia crassiuscula Sowerby.
" *Perna* " *infraliasica* (Quenstedt).
Mactromya arenacea (Terquem).
Protocardia phillipiana (Dunker).
Pleuromya tatei var. *altior* Richardson & Tutcher.
Modiolus laevis Sowerby.
Ostrea hisingeri Nilsson.

BRACHIOPODA

Ornithella sarthacensis d'Orbigny.
Calcirhynchia calcarea S. Buckman.

The fossil specimens listed above were identified by reference to the large collections at Bristol University by Mr. T. R. Fry, who made the following observations :—" The specimens appear to indicate a continuous sequence of Lower Lias zones, from the base to the Conybeari Subzone. This is in accordance with the records of sections elsewhere in the region."

Fragments of a bed of phosphatic limestone of a conglomeratic character were also found : these contain shells, mainly of *Cardinia* and ammonites many of which are converted to brown or black phosphate. The occurrence of *Schlotheimia lymensis* and *Metophioceras* in this bed suggests that its horizon is near the junction of the Angulata and Conybeari Subzones. The deposit may be compared with the remanié bed occurring near Keynsham which was shown to have been formed during the time of the succeeding Rotiforme Subzone.

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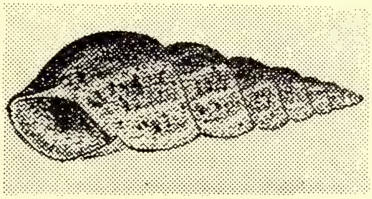
AN INLAND OCCURRENCE OF THE POINTED SNAIL

By H. W. Bird

RECORDS of the distribution in Britain and on the Continent of the Pointed Snail, *Cochlicella acuta* (Müller) show that this mollusc is characteristically found near the sea-coast on dry, grassy places and sandhills.

A few reports, however, suggest that the snail, formerly referred to under the names *Helix acuta*, *H. barbara*, *Helicella barbara* and *Bulimus acutus*, sometimes exists in inland sites. One such early record is by Mr. Thompson of Belfast (Jeffreys, 1862). In the list compiled by Professor Leipner (1875) of Mollusca of the Bristol District, *C. acuta* is given as found by T. G. Ponton under stones on the Downs in 1863 and by W. W. Stoddart in Leigh Woods, where Leipner himself also knew the snail. E. W. Swanton (1912), however, refers to the species as " strictly xerophile and exclusively confined to the sandhills bordering the coast ", and is unable to confirm the records of Leipner. Swanton notes that *C. acuta* is abundant on the sand dunes between Weston-super-Mare and Burnham.

My recent observations show that the snail is still common in the coastal area between Burnham and Weston. To find it in the wooded Goblin (Cleeve) Combe (National Grid reference ST 461655), some seven miles from the coast, was, however, unexpected.



The Pointed Snail (x *c*.2¼) from Goblin Combe.[1]

The single living specimen which I saw on August 19, 1959, was on a stone wall amongst stinging nettles. It was a greyish-white form, shown in the illustration.

[1] I am indebted to the *Western Daily Press and Bristol Mirror* for this block.

This find lends confirmation to the earlier records mentioned which suggest that the Pointed Snail may occasionally occur some distance from the coast.

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HYPOGEOUS FUNGI OF THE BRISTOL DISTRICT

By Lilian E. Hawker

(Department of Botany, University of Bristol)

INTRODUCTION

MANY higher fungi (Ascomycetes and Basidiomycetes) inhabit the leaf litter or the surface layers of the soil under trees. They are usually present in the vegetative or mycelial form but, at certain times of the year and under favourable weather conditions, many of them produce large fruit-bodies, such as the morels, toadstools and puffballs. Although they may begin their development beneath the surface most of these emerge above the litter layer before they mature and many have complex mechanisms ensuring spore dispersal. The fruit-bodies of a relatively small number of species reach maturity without emerging above the surface. These are the *hypogeous fungi*, an ecological group showing general morphological similarity but of diverse origin and development. They include members of the Ascomycetes (the true truffles and related members of the group Tuberales and the hart's truffle, *Elaphomyces*) and Basidiomycetes (the so-called " false truffles ", classed among the Gasteromycetes and showing relationship to various epigeous members of this group). The genus *Endogone* (usually classed in the Zygomycetes, a group of Lower Fungi, but showing some affinities with the lower Ascomycetes) also produces hypogeous fruit-bodies. The mature fructifications are superficially similar, usually more or less globose and consisting of an inner fertile part, the *gleba*, which is often chambered or much folded and an outer wall or rind, the *peridium*. They are indehiscent, the spores probably being dispersed by rodents and soil invertebrates which eat the ripe fruit-bodies.

Twenty-one genera (of which one is a doubtful record) containing 72 species (of which 8 are doubtful records) have been recorded for Britain, and many of these have been found in and around Bristol.

About 100 years ago a group of amateur mycologists and botanists was active in the Bristol district. These included C. E. Broome, who for a time lived at Batheaston, H. O. Stephens, G. H. K. Thwaites and W. R. Crotch. Broome (1874) gives a brief account of some of their activities in an article entitled " Notes on Bristol Fungi " in these Proceedings. He mentions a number of hypogeous fungi, some of which were new records and some new to Britain. Some of these are included in Berkeley and Broome's " Notices of British Fungi " (1841–79) and " Notices of British Hypogeous Fungi " (1846). Specimens of many of these collections are preserved in Broome's Herbarium at the British Museum (Natural History) and accounts of the collections and discussions of their identity can be found, mixed with much other matter not always of a scientific nature, in the Berkeley & Broome correspondence now in the library at the museum. The famous British mycologist, the Rev. M. J. Berkeley, corresponded and exchanged specimens not only with Broome and other British enthusiasts but with such famous continental mycologists as Tulasne by whom some of the Bristol "finds" were named. Later C. Bucknall published in these PROCEEDINGS a series of articles entitled "The Fungi of the Bristol District" (1878–91) and these include a number of references to hypogeous species.

From this time until 1948 few hypogeous fungi were collected in Britain although European and N. American mycologists published a number of monographs relating to them. The records of fungi collected at the annual Fungus Forays of the British Mycological Society include only seven species of hypogeous fungi and it was concluded that these were rare. In September 1948 during the Belfast Foray of the B.M.S. a number of fruit-bodies of *Tuber puberulum* were collected by Dr. P. H. Gregory and interest was aroused in the collection made by Broome and his associates. On returning to Bristol the author decided to look for these hypogeous fungi in the areas which yielded so many of Broome's collections. The search was rewarded at the first attempt by the discovery of four species under a single beech tree in a Cotswold wood. Since 1948, with the aid of a number of colleagues and students in the Department of Botany, Bristol University, the author has made some 1,200 separate collections within a radius of 25 miles from Bristol. All but three of the species recorded by Broome and his associates have been found, often in considerable quantity, at or near the sites mentioned by him, and three new records (*Wakefieldia macrospora*, *Rhizopogon reticulatus* and *Hydnangium carneum* var. *xanthosporum*)[1] together with others new to Britain (*Gautieria morchellaeformis*, *Rhizopogon provincialis*,[2] *Endogone fuegiana*) have been made. The results up to 1954 were included in a monograph of British Hypogeous Fungi (Hawker, 1954) and in other shorter papers (Hawker, 1951, 1952a and b). Some later records have since been published (Hawker, 1955a and b; Godfrey, 1957a).

The present paper is an account of the hypogeous fungi collected in and around Bristol. For descriptions and illustrations of the species mentioned the monograph referred to above (Hawker, 1954) may be consulted.[3]

[1] In N. Wales.

[2] New Forest.

[3] Copy in B.N.S. Library.

HYPOGEOUS FUNGI COLLECTED WITHIN THE PRESENT BOUNDARIES OF THE CITY AND COUNTY OF BRISTOL

Broome refers to a number of areas in Bristol in which interesting fungi, including hypogeous fungi, were collected. These areas are also recorded on his herbarium sheets and by Bucknall (l.c.). A favourite collecting ground was Leigh Woods which yielded 19 hypogeous species, including the first specimen of *Arcangeliella stephensii* (syn. *Octaviania stephensii*, *Hydnangium stephensii*), a rare fungus which was first collected by Stephens, and is known only from Bristol and Wraxall. (A single specimen, from Leigh Woods, has been collected during the present investigation.) Hanham Woods yielded 11 species, Stapleton Grove 12 and several were recorded from various sites, including Durdham Down, Kingsweston Park, Stoke Lodge (Druid's Stoke) and Southmead.

The writer and her associates attempted to go over the ground where the earlier collectors had reported hypogeous fungi. All these sites are probably much altered, some have been built over (some even during the last 10 years) and many are not clearly specified. Even those such as Leigh Woods and Kingsweston (Blaise Castle), which have not been built over have suffered increased trampling and the surface vegetation has almost certainly changed in nature and amount with ageing of the trees. Nevertheless almost all the species recorded for Bristol by Broome and his associates have been rediscovered, often at or near the site quoted by them, and a few additions have been made to the Bristol List.

1. Leigh Woods.

Leigh Woods is a historic collecting ground which, largely through the activities of Broome and his friends, has yielded a long and varied list of fungi, including many new records and first records for Bristol. In a favourable autumn it is still possible to collect a number of species but the woods have suffered from cutting, which has enabled such ground-covering plants as ivy and brambles to spread, and from trampling. Both close ground vegetation and trampling reduce the aeration of the soil and are unfavourable to the growth of the mycelium of most higher fungi. Most of the collections made since 1948 have been from the few areas where the ground beneath large trees is comparatively untrampled and free of vegetation and from the edges of paths or cliffs. The number of specimens found was usually lower than that resulting from a comparable excursion in less disturbed areas elsewhere. *Endogone microcarpa*, however, was frequently found under dense undergrowth and a search under lime trees, said by Broome to be the only habitat of the rare *Arcangeliella* (*Hydnangium*) *stephensii*, yielded a single fruit-body of that species from an area overgrown with ivy. Other species were most common under beech. The 23 hypogeous species recorded from Leigh Woods, of which 4 were added during the present investigation, are given in Table 1.

2. Blaise Castle Estate and Kingsweston Down

This was not a favourite area for the earlier collectors although Broome (l.c.) mentions that some unspecified hypogeous fungi occurred in " the plantations belonging to Kingsweston Park " and his herbarium contains specimens of *Hymenogaster decorus* (now known to be an early stage of *H. olivaceus*) and *Stephensia bombycina* from Kingsweston.

Twenty species have been collected in the Blaise Castle estate since 1948, mostly from areas under holm oak, beech and yew, comparatively free of undergrowth. Increased trampling following the building of housing estates in the immediate neighbourhood is, as in Leigh Woods, spoiling this area as a collecting ground. The species found since 1948 are listed below with the number of separate collections in brackets after each name. Most collections were of one to several fruit-bodies but those species marked with an asterisk were usually found in quantity, most collections containing a dozen or more specimens. A plus sign means that some extra collections made by Miss R. Godfrey were not included in the records.

List of species collected at Blaise Castle since 1948

PHYCOMYCETES :	*Endogone macrocarpa** (5+), *E. microcarpa** (19+).
ASCOMYCETES :	*Genea hispidula* (2), *Tuber borchii* (2), *T. dryophilum* (6), *T. excavatum* (1), *T. puberulum** (7), *T. rapaeodorum* (1), *T. rufum* (10), *Balsamia platyspora* (2).
BASIDIOMYCETES :	*Sclerogaster compactus* (2), *Hymenogaster arenarius* (1), *H. griseus* (2), *H. hessei* (1), *H. olivaceus* (2), *H. tener** (21), *H. vulgaris* (7), *Melanogaster ambiguus* (4), *M. variegatus* var. *broomeianus* (5, one collection parasitised by *Sepedonium chrysospermum*).

3. Stapleton Grove

Berkeley & Broome (1841–79) record *Hymenogaster muticus* and *H. vulgaris* from Stapleton Grove and Broome (1874) states that " rare Hypogaei occur under the dead leaves, e.g. *Genea verrucosa*, *Hydnobolites cerebriformis* and two or three species of *Tuber*, *Hymenogaster*, etc." In addition his herbarium contains specimens of *Genea klotzschii*, *Hymenogaster olivaceus* and *H. tener* from this site. The exact site of " Stapleton Grove " is not quite clear but it is likely to

HYPOGEOUS FUNGI RECORDED FROM LEIGH WOODS

Species	Berkeley & Broome "Notices" (1841–1879)	Crotch (1852)	Broome (1874)	Herb. Broome	Bucknall (1878–91)	Bristol University (1948–1959)
PHYCOMYCETES						
Endogone microcarpa	..	..	..	+[1]	+[1]	+ (7 collections)
ASCOMYCETES						
Elaphomyces anthracinus	+[2]	+	..	+	..	..
E. granulatus	..	+	..	+	..	+ (2 collections)
E. muricatus	..	..	..	+	..	+ (1 collection)
Genea sphaerica	..	+	..	+	+	..
Tuber excavatum	+	+	+	+	..	+ (3 collections)
T. foetidum	..	..	..	..	..	+ (1 collection)
T. puberulum	..	..	+	+	..	+ (2 collections)
T. rapaeodorum	..	..	..	..	+	+ (1 collection)
Balsamia platyspora	..	..	..	..	..	+ (1 collection)
Hydnobolites cerebriformis	..	..	..	+	+	..
BASIDIOMYCETES						
Hysterangium thwaitesii	+	+	..	..	..	..
H. nephriticum	..	+	..	+	..	..
Arcangeliella asterosperma	+[3]	+	..	..	..	..
A. stephensii	..	..	+[4]	+[4]	..	+ (single specimen)
Stephanospora carotaecolor	..	+	+[5]	+[5]	+[5]	+ (2 collections)
Sclerogaster compactus	..	..	..	+[6]	+[6]	..
Hymenogaster hessei	..	..	..	..	..	+ (1 collection)
H. olivaceus	..	..	..	..	+[7]	+ (5 collections)
H. tener	..	..	..	..	+	+ (2 collections)
H. vulgaris	+	..	..	..	+	..
Rhizopogon rubescens	..	..	..	+	..	..
Melanogaster variegatus var. *broomeianus*	..	+[8]	..	+[8]	..	+ (2 collections)

+ represents at least one collection.

[1] Recorded as *Endogone pisiformis.* Specimen examined by the writer and found to be *E. microcarpa.*

[2] Single specimen ; Crotch and Broome may be referring to the same specimen.

[3] Recorded as *Octaviania asterosperma*, transferred to *Arcangeliella* (Zeller & Dodge, 1935) owing to presence of latex.

[4] Recorded as *Hydnangium stephensii*, collected Stephens, named after him by M. Tulasne, transferred to *Arcangeliella* (Zeller & Dodge, 1935) owing to presence of latex. Rare. Found only under lime trees.

[5] Recorded as *Hydnangium carotaecolor*, transferred to *Stephanospora* (Patouillard, 1914).

[6] Recorded as *Octaviania compacta*, transferrred to *Sclerogaster* (Saccardo, 1895).

[7] Recorded as *Hymenogaster pallidus*, shown to be early stage in development of *H. olivaceus* (Dodge & Zeller, 1934).

[8] Recorded as *Melanogaster variegatus*, variety *broomeianus* distinguished by Berkeley (1860).

have been the grounds of a large house which formerly stood there. A few large trees in private gardens may be relics of the area referred to by Broome. A recent search of the park areas of Eastwood, Frenchay and the Frome Valley (Snuff Mills) yielded only *Elaphomyces muricatus* from Frenchay.

4. Hanham Woods

Another of Broome's favourite collecting grounds was Hanham Woods which he describes as between Hanham Ferry and Bristol. Here he records among other " rarities " *Pachyphloeus citrinus*, *P. conglomeratus*[1] (" the only habitat known in Great Britain "), *Genea hispidula*, *Tuber puberulum*, and *Tuber dryophilum*. In addition, specimens of *Pachyphloeus melanoxanthus*, *Hymenogaster tener*, *Melanogaster ambiguus* and *M. variegatus* var. *broomeianus* (as *M. variegatus*) from Hanham are in Broome's herbarium. Again the exact site of Broome's collecting ground is not clear. A search of possible relics of such a wood in the Hanham area yielded *Tuber dryophilum*, *Hymenogaster arenarius* and *H. olivaceus* under lime trees by a roadside.

5. Miscellaneous areas

From the various sources given above a number of species can be listed for " Bristol " (Tables 2 & 3) or for certain specified sites in the city. Notable among these are *Tuber macrosporum* which according to Broome (1874) " occurred first for Great Britain " at Stoke House, Druid Stoke, together with *Stephensia bombycina*. By kind permission of the principal of the theological college now occupying Stoke House the writer was able to search the grounds. The grounds of the adjacent Wills Hall were also visited. Several specimens of *S. bombycina* were found under conifers in the Wills Hall grounds and afterwards a single specimen was found under lime just outside the present boundary of the Stoke House grounds. It is interesting to think that these may have been produced by the same perennial mycelium from which Broome collected fruit-bodies a hundred years ago. Later the writer found large numbers of fruit-bodies of this supposedly rare fungus on Mendip near Burrington Combe.

During this search the following species were also found : in Wills Hall grounds, *Hymenogaster olivaceus* and *Tuber nitidum ;* under lime near Stoke House boundary (since built over), *Endogone microcarpa*, *Pachyphloeus citrinus* (two immature fruit-bodies), *Tuber borchii*, *T. brumale*, *T. rapaeodorum*, *Balsamia fragiformis*, *Hymenogaster arenarius*, *H. griseus*, *H. olivaceus*, *H. sulcatus* and *H. tener*. *Tuber macrosporum* was not found here or anywhere else during this survey.

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[1] A single fruit-body was collected by the writer in 1950 at Wotton-under-Edge.

A number of species has been recorded at various sites in Bristol ; the writer found a number of large fruit-bodies (some weighing several ounces) of the edible white truffle, *Tuber aestivum*, and a single specimen of *Hymenogaster olivaceus* under holm oak in the grounds of the Royal Fort, University of Bristol ; earlier records are *Stephanospora carotaecolor* from Durdham Down (Bucknall 1878–91) ; *Hymenogaster olivaceus* from Bedminster (Crotch, 1852) ; specimens of *Hymenogaster muticus* (collected at Southmead by W. Phillips) and *Melanogaster ambiguus* (collected by H. O. Stephens at Clifton) are in Broome's herbarium.

HYPOGEOUS FUNGI COLLECTED IN THE COUNTRY SURROUNDING BRISTOL

In addition to the collections made within the present boundaries of the city of Bristol, Broome and his associates record a number of hypogeous fungi from areas in the surrounding country, including Batheaston (where Broome lived for some time), Abbots Leigh, Portbury and Wraxall (Naish House). Crotch records *Hymenogaster olivaceus* from Westridge, Wotton-under-Edge.

The writer and her associates, as already described, explored the old collecting grounds in Bristol as far as present day conditions permitted. Areas outside the city, notably the beech woods of the south Cotswolds around Wotton-under-Edge (40 species) and the Brockley and Cleeve Combe areas (27 species) were, however, more profitable collecting areas. The woods round Burrington yielded a number of specimens (20 species) although visited less often than the preceding areas. The Abbots Leigh–Failand area, including Abbots Pool woods (12 species), and the country around Portbury and Wraxall (10 species), were less productive. No collecting was attempted in the Batheaston area worked over by Broome. A few specimens (6 species) were received from Frome and the Wylie Valley. Two attempts to find hypogeous fungi in the Forest of Dean (one in the dry year of 1955) yielded only three species. These collections, together with those made in Bristol itself are summarised in Tables 2 and 3.

A few records are available for other parts of the West Country (S. Somerset, S. Devon and Herefordshire), including some made during the present study. No other part of the country has yielded so many species of hypogeous fungi and experience suggests that the richness of the yield from the Bristol area is not entirely due to the greater amount of attention it has received but reflects the suitability of conditions in this area for growth of these fungi.

TABLE 2

SPECIES OF ENDOGONE COLLECTED WITHIN 25 MILES OF BRISTOL

Species	Bristol (including Leigh Woods)	Somerset				Gloucestershire, Cotswolds (Wotton-under-Edge area)
		Abbots Leigh and Failand	Portbury, Clapton and Wraxall	Brockley and Cleeve	Mendips (Burrington & Emborough)	
Endogone macrocarpa	5, G	1		1, G	..	2
E. microcarpa[1]	25, B&B, Br, Bu, G.	2	9, Herb Br.	26, Herb Br, G.	1	3
E. fasciculata[2]	..	..	..	G	..	..
E. sp. (*fasciculata-vesiculifera* group)[3]	..	..	..	G	..	..
E. lactiflua	..	..	..	8, G	4	13

Names of species are corrected to conform to present day usage. The figures represent the numbers of collections made by the writer and associates. Some of these contained numerous specimens.

B & B = Berkeley & Broome (1841–1879).
Br. = Broome (1874).
Herb Br = in Broome's herbarium.
Bu = Bucknall (1878–91).
G = Godfrey (1957a).

[1] Also collected in Frome area by Dr. B. E. J. Wheeler, and in Forest of Dean by Dr. V. O. Nicholls (British Mycological Society Autumn Foray 1951).

[2] First recorded for Britain by Godfrey (1957a).

[3] Single specimen collected by Godfrey (1957a).

FACTORS INFLUENCING THE DISTRIBUTION OF HYPOGEOUS FUNGI

From Tables 2 and 3 it is clear that a few species, notably *Endogone microcarpa*, *Elaphomyces granulatus*, *E. muricatus*, *Tuber puberulum*, *Hymenogaster luteus*, *H. olivaceus* and *H. vulgaris* are widely distributed throughout the area under consideration. Not only were these species collected frequently but each collection usually contained numerous specimens. Others such as *Endogone lactiflua*, *Elaphomyces anthracinus*, *Genea hispidula*, *Tuber excavatum* and *Hymenogaster tener* were less generally distributed but abundant in some places. Others again were found in only one or two places where, however, they were always to be found in abundance in favourable seasons. These include *Hysterangium nephriticum*, *Rhizopogon rubescens*, *R. reticulatus* and *Melanogaster variegatus* var. *broomeianus*. Some were found sporadically in gregarious clusters (e.g. *Genea klotzschii*, *Stephensia bombycina*, *Gautieria morchellaeformis* and *Sclerogaster compactus*) or as isolated fruit-bodies (e.g. *Pachyphloeus* spp.).

Weather, soil conditions and surface vegetation were recorded for each collection and from this mass of data some conclusions can be drawn relating to the influence of these factors.

1. Season and weather

The fruit-bodies of the hypogeous Gasteromycetes develop rapidly and are soft and evanescent. Consequently they are found at all times of the year when temperature and soil moisture are suitable and are absent in very dry or very cold periods.

In contrast the fruit-bodies of the Tuberales are initiated in spring, develop slowly and are mature in late summer and autumn. Some are leathery or hard and may persist in the soil until the following January. Cold, dry weather in the early parts of the year delays or prevents the initiation of fruit-bodies. Fruit-bodies which begin development in late spring or summer either fail to mature or are reduced in size. A dry spell later in the year may also reduce the size of fruit-bodies or, if prolonged, cause them to abort.

Similarly the fruit-bodies of *Endogone lactiflua* are initiated in spring and develop during the summer, sometimes persisting in the soil until the following spring. Those of other species of *Endogone* are initiated in greatest number in spring but may also be initiated at other times of the year under suitable weather conditions. Hence, while mature specimens are most readily found in summer and autumn, they may often be found at other times of the year.

The British species of *Elaphomyces*, with the exception of the rare *E. leucosporus*, produce fruit-bodies with a tough outer peridium.

TABLE 3

HYPOGEOUS ASCOMYCETES AND BASIDIOMYCETES COLLECTED WITHIN 25 MILES OF BRISTOL

Species	Bristol (including Leigh Woods)	Somerset					Gloucestershire, Cotswolds (Wotton-under-Edge area)
		Abbots Leigh and Failand	Portbury, Clapton and Wraxall	Brockley and Cleeve	Mendips (Burrington and Emborough)	Batheaston and Bathford	
ASCOMYCETES							
EUROTIALES							
Elaphomyces aculeatus[1]	..	..	..	..	..	..	3
E. anthracinus	B&B, Cr	..	..	..	..	..	20
E. granulatus[2, 3]	2	15	4	2	1	..	4
E. leucosporus	..	..	1	1	..	..	1
E. muricatus[2, 3]	2	8	2	2	1	..	33
TUBERALES							
Stephensia bombycina	3, Br, Herb Br	..	..	..	4	..	1
Genea hispidula	2, Cr, Br, Bu	7	1	..	..	..	..
G. klotzschii	Herb Br	..	..	3	..	..	..
G. sphaerica	Herb Br	..	..	..	..	..	4
G. verrucosa	Br, Herb Br	..	Herb Br	1	..	..	..
Pachyphloeus citrinus	1, Br	..	Cr	..	..	..	..
P. conglomeratus	Br, Herb Br	..	..	..	..	..	1
P. melanoxanthus	Herb Br	..	..	..	..	..	..
Tuber aestivum	2	..	..	..	..	Cr	7
T. borchii	3	..	Cr	..	1	..	11
T. brumale	2	..	..	..	..	Cr	1
T. dryophilum	5, B&B	..	..	1	2	..	17
T. excavatum[2]	4, B&B, Cr, Br	..	..	..	2	B&B	23
T. foetidum	1	..	..	..	7	..	2
T. macrosporum	B&B	..	..	..	..	B&B	..
T. maculatum	..	Cr	..	3	..	Cr	4
T. nitidum	2	..	..	..	..	..	2
T. puberulum	8, B&B	6	11, Cr	31	8	..	80
T. rapaeodorum	3	4	..	1	6	..	30
T. rufum	10	..	1	..	4	Cr	30
Hydnobolites cerebriformis	Herb Br, Bu	..	..	2	..	..	4
Balsamia fragiformis	4	..	..	..	..	Herb Br	3
B. platyspora	3	..	..	..	2	..	..

Gautieria morchellaeformis[1]	..	..	..	..	..	..	4
Hysterangium nephriticum	Cr	..	..	10	..	..	18
H. thwaitesii	B&B, Cr	..	..	1	..	..	1
HYDNANGIACEAE							
Arcangeliella asterosperma	B&B, Cr	..	..	..	..	..	8
A. stephensii	1, Br	..	Br	..	..	..	..
Stephanospora carotaecolor	2, Cr, Br, Bu	1	..	2, B.M.S.	..	..	..
Sclerogaster compactus	2, Herb Br, Bu	..	..	2	..	..	..
Wakefieldia macrospora[4]	..	..	..	..	..	..	6
HYMENOGASTRACEAE							
Hymenogaster arenarius	4	..	..	..	..	..	1
H. citrinus	..	..	..	1	2	Herb Br.	9
H. griseus	3	..	..	..	3	..	12
H. hessei[1]	5	..	1	1	1	..	2
H. luteus[2]	3	Cr	..	5	7	Herb Br	28
H. muticus	B&B	..	..	..	..	..	..
H. olivaceus[2]	10, Herb Br, Bu	..	2	5	10	Herb Br	69, Herb Br
H. sulcatus	1	..	..	..	..	..	..
H. tener	25, Herb Br, Bu	..	3	14, Herb Br. Cr	..	Herb Br	9
H. thwaitesii	..	..	B&B, Cr.	..	..	..	..
H. vulgaris	8, B&B, Bu	1	5	8	5	..	7
RHIZOPOGONACEAE							
Rhizopogon rubescens	Herb Br	..	Br, Herb Br, Cr	13	..	..	..
R. reticulatus[5]	..	..	..	..	5	..	..
Melanogaster ambiguus[6]	Herb Br	..	..	..	..	..	4
M. variegatus var. *broomeianus*	3, Cr. Herb Br	..	..	2	..	..	5

Names of species are corrected to conform with present day usage. The figures represent the number of collections made by the writer and associates. Some of these contained many specimens.

B & B = Berkeley & Broome (1841–1879).
Cr = Crotch (1852).
Br = Broome (1874).
Herb Br = in Broome's herbarium.
Bu = Bucknall (1878–91).
B.M.S. = British Mycological Society, Foray Report 1930. *Trans. Brit. mycol. Soc.* **15**.

[1] First recorded for Britain, Hawker (1952b).

[2] Also collected in Frome area by Dr. B. E. J. Wheeler.

[3] Also collected in Forest of Dean, Autumn Forays, British Mycological Society 1951, 1955.

[4] First record (Hawker, 1951, 1954).

[5] First record (Hawker, 1955a).

[6] The red or Bath truffle, an edible species formerly sold in Bath market.

TABLE 3

HYPOGEOUS ASCOMYCETES AND BASIDIOMYCETES COLLECTED WITHIN 25 MILES OF BRISTOL

Species	Bristol (including Leigh Woods)	Somerset					Gloucestershire, Cotswolds (Wotton-under-Edge area)
		Abbots Leigh and Failand	Portbury, Clapton and Wraxall	Brockley and Cleeve	Mendips (Burrington and Emborough)	Batheaston and Bathford	
ASCOMYCETES							
EUROTIALES							
Elaphomyces aculeatus[1]	..	..	..	..	..	..	3
E. anthracinus	B&B, Cr	..	..	..	..	..	20
E. granulatus[2, 3]	2	15	4	2	1	..	4
E. leucosporus	..	..	1	1	..	..	1
E. muricatus[2, 3]	2	8	2	2	1	..	33
TUBERALES							
Stephensia bombycina	3, Br, Herb Br	..	..	..	4	..	1
Genea hispidula	2, Cr, Br, Bu	7	1	..	..	..	..
G. klotzschii	Herb Br	..	..	3	..	..	..
G. sphaerica	Herb Br	..	..	..	..	..	4
G. verrucosa	Br, Herb Br	..	Herb Br	1	..	..	..
Pachyphloeus citrinus	1, Br	..	Cr	..	..	..	..
P. conglomeratus	Br, Herb Br	..	..	..	..	..	1
P. melanoxanthus	Herb Br	..	..	..	..	..	..
Tuber aestivum	2	..	..	..	..	Cr	7
T. borchii	3	..	Cr	..	1	..	11
T. brumale	2	..	..	..	..	Cr	1
T. dryophilum	5, B&B	..	..	1	2	..	17
T. excavatum[2]	4, B&B, Cr, Br	..	..	..	2	B&B	23
T. foetidum	1	..	..	..	7	..	2
T. macrosporum	B&B	..	..	..	..	B&B	..
T. maculatum	..	Cr	..	3	..	Cr	4
T. nitidum	2	..	..	..	..	..	2
T. puberulum	8, B&B	6	11, Cr	31	8	..	80
T. rapaeodorum	3	4	..	1	6	..	30
T. rufum	10	..	1	..	4	Cr	30
Hydnobolites cerebriformis	Herb Br, Bu	..	..	2	..	..	4
Balsamia fragiformis	4	..	..	..	..	Herb Br	3
B. platyspora	3	..	..	..	2	..	..
B. vulgaris	[illegible]	Herb Br, Cr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HYSTERANGIACEAE							
Gautieria morchellaeformis[1]	..	..	..		..	..	18
Hysterangium nephriticum	Cr	..	..	10	..	..	1
H. thwaitesii	B&B, Cr	..	..	1	..	..	
HYDNANGIACEAE							
Arcangeliella asterosperma	B&B, Cr	..	..	..	..	..	8
A. stephensii	1, Br	..	Br	..	..	..	..
Stephanospora carotaecolor	2, Cr, Br, Bu	1	..	2, B.M.S.	..	..	..
Sclerogaster compactus	2, Herb Br, Bu	..	..	2	..	..	..
Wakefieldia macrospora[4]	..	..	..	..	..	..	6
HYMENOGASTRACEAE							
Hymenogaster arenarius	4	..	..	..	..	..	1
H. citrinus	..	..	..	1	2	Herb Br.	9
H. griseus	3	..	..	..	3	..	12
H. hessei[1]	5	..	1	1	1	..	2
H. luteus[2]	3	Cr	..	5	7	Herb Br	28
H. muticus	B&B	..	..	..	..	..	..
H. olivaceus[2]	10, Herb Br, Bu	..	2	5	10	Herb Br	69, Herb Br
H. sulcatus	1	..	..	..	..	..	..
H. tener	25, Herb Br, Bu	..	3	14, Herb Br. Cr	..	Herb Br	9
H. thwaitesii	..	..	B&B, Cr.	..	..	..	..
H. vulgaris	8, B&B, Bu	1	5	8	5	..	7
RHIZOPOGONACEAE							
Rhizopogon rubescens	Herb Br	..	Br, Herb Br, Cr	13	..	..	..
R. reticulatus[5]	..	..	..	..	5	..	..
Melanogaster ambiguus[6]	Herb Br	..	..	..	..	..	4
M. variegatus var. *broomeianus*	3, Cr. Herb Br	..	..	2	..	..	5

Names of species are corrected to conform with present day usage. The figures represent the number of collections made by the writer and associates. Some of these contained many specimens.

B & B = Berkeley & Broome (1841–1879).
Cr = Crotch (1852).
Br = Broome (1874).
Herb Br = in Broome's herbarium.
Bu = Bucknall (1878-91).
B.M.S. = British Mycological Society, Foray Report 1930. *Trans. Brit. mycol. Soc.* **15**.

[1] First recorded for Britain, Hawker (1952b).

[2] Also collected in Frome area by Dr. B. E. J. Wheeler.

[3] Also collected in Forest of Dean, Autumn Forays, British Mycological Society 1951, 1955.

[4] First record (Hawker, 1951, 1954).

[5] First record (Hawker, 1955a).

[6] The red or Bath truffle, an edible species formerly sold in Bath market.

They are initiated at any time of the year when soil temperature and water content are suitable and once mature they are able to withstand prolonged periods of cold or drought. Mature fruit-bodies can thus be found at any time in a normal year but young ones are only present during and immediately after warm, wet periods.

These species of *Elaphomyces*, *Tuber excavatum*, *Endogone microcarpa* and, to a lesser extent, *Genea* spp. are the species best able to withstand prolonged drought. Others are seldom found in hot, dry summers. Only *Elaphomyces granulatus* was found in September 1959 after the record dry summer of that year.

2. Soil conditions

Most of the species listed are either found only in limestone areas or are most numerous in such areas. A few species such as *Elaphomyces granulatus*, *Endogone microcarpa*, *Genea klotzschii*, *Stephanospora carotaecolor*, *Rhizopogon rubescens* and *R. reticulatus* occurred most commonly where leaching had rendered the soil more acid. Species in the British list believed to be characteristic of relatively acid soils (e.g. *Rhizopogon luteolus*, *Gyrocratera ploettneriana* and *Hydnotrya tulasnei*) have not been found in the Bristol area.

Species differ in their water requirements and in their toleration of poor aeration. The majority occur most often in well-drained soils where ground vegetation is scanty or absent. Sloping areas, dykes, the entrances to old badger earths and the edges of paths are frequent habitats. Dry shifting soil, however, is unsuitable and some species (e.g. *Genea* spp.) are most commonly found where the surface layers are bound by a thin growth of moss. Most species are unable to grow in compacted soil under a dense cover of undergrowth, but *Arcangeliella stephensii*, *Endogone microcarpa* and *Sclerogaster compactus* were collected in such habitats. Many species are found chiefly in the litter layer under trees, often at the junction of this with a harder layer of soil. Most species do not, however, produce fruit-bodies in deep layers of poorly-drained litter, exceptions being *Tuber puberulum* and *Hysterangium thwaitesii*.

3. Surface vegetation

It has already been pointed out that fruit-bodies of hypogeous fungi are seldom found under dense herbaceous or shrub vegetation. Reduced aeration is probably a factor here, but competition for water and nutrients may also play a part.

The tree cover is of great importance. Many species are seldom found except under a particular species of tree (e.g. *Elaphomyces aculeatus*, *E. muricatus*, *Tuber excavatum* under beech). Some are more frequent in association with certain species than with others. In the present study the largest number of species was found under beech but the ground under evergreen oak (*Quercus ilex*) or lime (*Tilia* spp.) was also favourable. Few species were found under deciduous oak. A number (e.g. *Endogone lactiflua*, *Stephanospora carotaecolor*, *Rhizopogon* spp.) are characteristic of coniferous woods (larch, pine or spruce). *Elaphomyces granulatus*, *Endogone microcarpa* and *E. macrocarpa* may be found sporadically under a number of unrelated species but are most numerous under pine, yew and yew respectively. It is extremely likely that most hypogeous fungi are mycorrhizal and are almost, if not entirely, dependent upon association with the roots of a particular tree or trees. Such a relationship has been proved for certain species of *Rhizopogon* and there is good evidence that other species, including *Tuber* spp., are similarly mycorrhizal.

4. Animals.

Man, by cultivating or otherwise disturbing or trampling the soil, planting or cutting down trees, by building roads and houses or by controlling other animals has undoubtedly had a profound effect on the distribution of hypogeous and other fungi.

The spores of hypogeous fungi are thought to be distributed by rodents which, attracted by the strong odour, dig up and eat the ripe fruit-bodies of many species. It is not possible to say whether the scarcity of fruit-bodies in 1957, 1958 and 1959 was due to the reduction of the rabbit population by myxomatosis or to dissimilar but unfavourable weather conditions in these years. Eelworms, slugs, fly larvae and other soil invertebrates tunnel in the fruit-bodies of many species and may be concerned in spore dispersal.

5. Fungal parasites

A few species are attacked by other fungi. *Elaphomyces granulatus* and *E. muricatus* are frequently attacked by *Cordyceps capitata* and *C. ophioglossoides* respectively. Where these parasites are present large numbers of fruit-bodies are attacked and distribution of the host may well be influenced. Fruit-bodies of *C. ophioglossoides* have been found near Abbots Pool. At Emborough, in Mendip, and a few other sites aborted fruit-bodies of *E. granulatus* and *E. muricatus* have been found permeated by mycelium and surrounded by the characteristic yellow mycelial strands of the parasite.

Largely disintegrated fruit-bodies of *Melanogaster variegatus* var. *broomeianus* parasitised by *Sepedonium chrysospermum* were collected under a beech tree in the Blaise Castle grounds in 1953 (Hawker, 1955b) and 1954. Since then no specimens of the host have been found under this particular tree.

Berkeley & Broome (1861) record *Battarina inclusa* (as *Hypocrea inclusa*) growing on fruit-bodies of *Tuber puberulum*. This parasite has been found on the same host during the present investigation at Wotton-under-Edge (Hawker, 1955b) and at Burrington. The host was abnormally lobed and pale in colour and did not produce mature spores. This parasite was not sufficiently widespread to have much effect on distribution of the host.

Godfrey (1957b) found that chlamydospores of *Endogone microcarpa* and *E. macrocarpa* were frequently invaded by an unidentified fungus and that such parasitised spores failed to germinate. It is possible that this fungus may influence distribution of the host.

In conclusion it may be remarked that the present study has justified Broome's (1874) statement that " an abundant source of amusement and inducement for rural excursions presents itself for ladies or gentlemen, free from the toils of business, in this department of botany ".

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CONTENTS

	PAGE
Council	88
New Members and Changes of Address	89
Report of Council	93
Report of Entomological Section	93
Hon. Treasurer's Statement of Accounts	94
Report of Botanical Section	95
Report of Geological Section	96
Report of Ornithological Section	98
Report of Junior Section	99
Account of the General Meetings	101
Hon. Librarian's Report	102
Obituaries : A. H. Peach, Mrs. C. I. Sandwith	103
Bristol Botany in 1960, by Cecil I. and N. Y. Sandwith	107
Bristol Bird Report, 1960	113
Lepidoptera Notes, Bristol District, 1960, by C. S. H. Blathwayt ..	137
Basal Gravel in the Alluvium near Severn Beach, by C. E. Leese and W. F. Vernon	139
Chromosome Numbers in *Calamagrostis epigejos* (L.) Roth from Southern Britain, by D. H. Junkison, E. W. Davies and L. C. Frost ..	145
The Radstock Plateau—a Note on the Physiography of the Bristol District, by S. W. Wooldridge	151
Beach Drift Experiments at Bridgwater Bay, Somerset, by C. Kidson and A. P. Carr	163

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A.	Jones, M. R.	10 Park Road, Warmley, Bristol
	Jones, Miss S. M., B.Sc.	20 Ormerod Road, Stoke Bishop, Bristol, 9
	Larn, Mrs. E.	88 Kingsway, St. George, Bristol, 5
	Larn, J. D.	Do.
A.	Lennon, I. G.	8 Druid Road, Stoke Bishop, Bristol, 9
	Long, Miss G. E.	57 Apsley Road, Clifton, Bristol
	Long, Miss J. E.	Do.
	Machin, Mrs. J. E.	106 Cromwell Road, St. Andrew's, Bristol, 6
	McKeag, Mrs. I. M.	4 Caledonia Place, Clifton, Bristol, 8
	Noddle, Miss B. A., M.A., M.B.Vet.	36 Old Sneed Avenue, Bristol, 9
	Owen, Mrs. M. I.	31 Kendon Drive, Westbury-on-Trym, Bristol
	Parfitt, Mrs. B. J.	4 Caine Road, Horfield, Bristol, 7
	Pascoe, Miss P. B.	31 Rannoch Road, Bristol, 7
	Peddle, F. H.	87 Chiphouse Road, Kingswood, Bristol
	Peddle, Mrs. F. H.	Do.
	Peters, J. A. V.	208 Henleaze Road, Westbury-on-Trym, Bristol
	Pillman, Miss J.	Glenbarr, 10 Seaton Road, Bristol, 5
	Pitt, Mrs. J.	Trout Cottage, Chota Castle, Chew Magna, nr. Bristol
	Poegal, V. F.	Begbrook Farm, Begbrook Lane, Stapleton, Bristol

A.	Pont, A. C.	16 Woodstock Road, Redland, Bristol, 6
	Potter, C. W.	Exmoor, Southdene, Bristol, 9
	Proctor, D., B.A.	17 Vyvyan Terrace, Clifton, Bristol, 8
	Proctor, Mrs. D., N.F.F.	Do.
	Purkis, Miss E. M.	1 Osborne Road, Clifton, Bristol, 8
	Radley, P. F., B.A., B.Litt.	Penhaven, Winscombe, Somerset
	Reade, D. J., B.Sc.	39 Florence Park, Westbury Park, Bristol, 6
	Rowat, Miss B.	Bury House, Wick, nr. Bristol
C.	Sandwith, N. Y., M.A., F.L.S.	The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey
	Sewell, Miss H. M. E.	10 Pembroke Road, Clifton, Bristol, 8
	Silcocks, Mrs. T. B.	Bryher, Kenmeade Close, Shipham, Winscombe, Somerset
	Sligo, Miss E. E.	21 Lodore Road, Fishponds, Bristol
	Smart, Miss M. E., B.Sc.	The Old Library, King Street, Bristol, 1
	Smith, Miss B. J.	9 West Parade, Sea Mills, Westbury-on-Trym, Bristol
	Smith, R.	Elmleaze, Chew Stoke, nr. Bristol
	Smith, Mrs. R.	Do.
	Stopher, D.A., B.Sc.	12 St. Hilary Close, Stoke Bishop, Bristol, 9
	Tanner, Miss A.	Garden Flat, 15 Grove Road, Redland, Bristol, 6
A.	Taylor, C. J. H.	12 Claremont Avenue, Bishopston, Bristol, 7
	Thompson, Mrs. M. E.	157 Westbury Lane, Sea Mills, Bristol, 9
	Trewman, Mrs. Y. C. B.	11 Osborne Road, Clifton, Bristol, 8
	Watson, Miss V. M.	28 Pembroke Road, Clifton, Bristol, 8
	Weeks, A. H.	The Bungalow, The Causeway, Yatton, nr. Bristol
	Whiteway, Mrs. G.	24 Oakfield Grove, Clifton, Bristol, 8

NEW AFFILIATED SOCIETY

Brislington Secondary School Natural History Society	Brislington Secondary School, Hungerford Road, Brislington, Bristol, 4

CHANGES OF ADDRESS

	Aliband, D. E.	61 Hampton Park, Redland, Bristol, 6
A.	Baker, J. R.	The Veterinary Field Station, Langford House, Langford, Somerset
	Bennett, Miss E. B.	2 Alexandra Road, Southmead, Bristol
	Box, Miss N. C.	104 Wells Road, Bath, Somerset
	Brooke, B. K.	Moorside Cottage, West End, Nailsea, nr. Bristol
	Bryce, Miss J. L.	Buckland's Cottage, Cold Ashton, Chippenham, Wiltshire
	Campbell, D. G.	30 Albert Road, Clevedon, Somerset
	Day, R.	Manzai, Dancing Lane, Wincanton, Som.
	Fleetham, Miss M. W.	Woodside, Hallen Lodge, Hallen, Bristol

	Flook, H. F.	Sunnyside, Keyton Hill, Blackford, Wedmore, Somerset
	Flook, Mrs. H. F.	Do.
	Ford, J. H.	The Small House, Syston, Mangotsfield, nr. Bristol
	Ford, Mrs. J. H.	Do.
	Foster, Mrs. D.	150 Portway, Sea Mills, Bristol
	Grimes, N. W., B.Sc.	33 Balmoral Road, St. Andrew's, Bristol, 7
	Harris, Professor J. E. M.A., Ph.D., F.R.S.	Pine Trees, Camp Lane, Clapton-in-Gordano, nr. Bristol
	Hobbs, C. R.	The Cottage, 137 Tower Road North, Warmley, Bristol
	Hobbs, Mrs. C. R.	Do.
	Horn, Miss E. J., M.A.	Wentwood, Ram Hill, Coalpit Heath, nr. Bristol
	Howell, D.	26 Bibury Avenue, Stoke Lodge, Patchway, Bristol
	Husband, Mrs. A. R.	6 Downside Road, Clifton, Bristol, 8
	Jolly, G. F., D.Obst., R.C.O.G.	The Lodge Bungalow, Southmead General Hospital, Westbury-on-Trym, Bristol
	Jones, Miss B. E., B.Sc.	1 Julian Road, Sneyd Park, Bristol, 9
C.	Loupekine, Professor I. S., B.Sc., Ph.D., A.M.I.M.M., F.G.S.	Geology Department, The Royal Technical College of East Africa, P.O. Private Bag, Nairobi, Kenya
C.	Merrie, T. D. H., B.A., G.I.Mech.E.	12 Southpark Avenue, Glasgow, W.2
	Parslow, A. E.	41 Woodleigh Gardens, Whitchurch, Bristol, 4
	Parslow, Mrs. A. E.	Do.
	Pitman, R. A.	127 Coldharbour Road, Westbury Park, Bristol, 6
	Poole, B. W. C.	54 Gloucester Road North, Bristol, 7
A.	Potter, N. B.	15 Victoria Square, Clifton, Bristol, 8
	Rake, Miss B. A., B.Sc.	18 Providence Lane, Long Ashton, Bristol
	Rogers, Mrs. M. J., M.A.	21 Canynge Square, Clifton, Bristol, 8
	Silcocks, T. B.	Bryher, Kenmeade Close, Shipham, Winscombe, Somerset
C.	Spiers, D. R., M.B.O.U., A.mem.A.O.U.	Rose Cottage, Tunworth, Basingstoke, Hampshire
	Stops, Mrs. S.	Ford's Farmhouse, Queen Charlton, Keynsham, Bristol
A.	Sutherland, I. H.	Anatomy Dept., The University, Bristol, 8
	Turner, Miss E. E. A.	12 Clyde Road, Redland, Bristol, 6
H.	Wallis, Dr. F. S., D.Sc., Ph.D., F.G.S.	Torquay Natural History Museum, Torquay, Devon
	Withers, Miss D.	104 Wells Road, Bath, Somerset

REPORT OF COUNCIL

1960

OUR membership has been maintained and is now 662, including a Junior Section of 105; there are 22 affiliated Societies. Next year is our Centenary year and we would like to see the membership reach at least 700 then.

At the Annual General Meeting the Officers and Members of Council were duly elected with Dr. F. Coles Phillips as President. The usual General and Sectional meetings were held and the Field Section maintained its vigorous character; in fact the Society seems to be full of life. Perhaps our most exciting venture was the film "Seabird Summer" organised conjointly by the R.S.P.B. and the Ornithological Section, and shown in the Colston Hall. This was a great success and the Society received a useful sum from the profits. The Annual Dinner, at which there was an attendance of 130, was held on March 18 in the Senior Common Room of the University, by courtesy of its members. The guest speaker was Professor H. R. Hewer, O.B.E., M.Sc., Sec.L.S.

The deaths of Mr. A. H. Peach (late Treasurer), Geoffrey Lowndes, Miss A. L. Naylor, Dr. C. L. Corbett, Mr. A. H. Russell, Mrs. M. D. H. Phillips and Mrs. C. I. Sandwith are recorded with much regret.

A. C. LEACH, *Hon. Secretary.*

REPORT OF ENTOMOLOGICAL SECTION

1960

AT the 96th Annual Business Meeting, held on January 5, 1960, Mr. Norman A. Watkins was re-elected President, and Mr. Cecil L. Bell Secretary. There were five indoor meetings during the year as follows:

Feb. 2: Films—*Leather Jacket, Flea Beetle, Red Spider.*

Mar. 31: Films—*The Marsh Fritillary Butterfly, Blowfly, Red Spider.*

Oct. 4: Visit to the City Museum to examine the various Insect collections.

Nov. 1: Colour slides of varieties of British Butterflies shown by Norman A. Watkins.

Talk on "Hemiptera" by M. Ackland.

Dec. 12: Joint Meeting with the Botanical Section, "The Inter-relation of plants and insects": *Behind the Scenes,* a sound and colour film by Cecil L. Bell; *The Living Soil,* a Shell film; colour slides of flowers by J. A. Eatough.

On Saturday, June 18, the Section held a Field Meeting in the Mendips at Burrington Combe.

CECIL L. BELL, *Hon. Secretary.*

The Hon. Treasurer in Account with the Bristol Naturalists' Society

Dr. RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31 DECEMBER, 1960 *Cr.*

1959 £ s. d.			£ s. d.	£ s. d.	£ s. d.
	To Members' Subscriptions :				
370 4 0	Full Members	1959	1 16 0		
		1960	477 13 6		
		1961	18 2 6		
				497 12 0	
38 5 0	,, ,, of the same household	1960	50 8 9		
		1961	1 5 0		
				51 13 9	
40 13 6	Country Members	1959	1 0 0		
				1 0 0	
1 5 0	Corresponding Members	1960	11 5 1		
				11 5 1	
7 17 0	Associates	1960	7 17 6		
		1961	1 15 0		
				9 12 6	
26 12 6	Juniors	1960	24 5 0		
		1961	15 0		
				25 0 0	
21 14 0	Affiliated Societies	1959	10 0		
		1960	31 10 0		
				32 0 0	
506 11 0					628 3 4
	,, *Proceedings* (1958):				
	Blocks, separates			15 14 0	
	Subscribers			1 5 0	
	,, *Proceedings* (1959):				
	Blocks, separates			15 16 11	
	Subscribers			2 0 0	
	,, Sales of Publications			2 8 0	
4 10 0					37 3 11
511 1 0					665 7 3
9 0 6	,, Field Committee : surplus over expenses				3 1 5
27 4 4	,, Profit on "Highland Birds" meeting				– – –
– – –	,, ,, ,, "Seabird Summer" meeting				61 12 2
7 17 9	,, Interest on deposit in Post Office Savings Bank				4 15 8
– – –	,, ,, ,, £200 5% Defence Bonds				7 17 6
555 3 7					742 14 0
384 19 10	,, Balances from last Account				362 10 7
£940 3 5					£1,105 4 7

P. J. M. NETHERCOTT, *Hon. Treasurer,*
12 January, 1961

1959 £ s. d.		£ s. d.	£ s. d.
98 11 9	By General Printing and Stationery	80 11 10	
85 6 10	,, Postages and Telephone	75 7 11	
12 0	,, Cheque Books	16 0	
5 5 0	,, Clerical Assistance	6 0 0	
10 5 0	,, Addressograph Machine	– – –	
200 0 7			162 15 9
259 2 0	,, *Proceedings* (1958 separates)	22 7 0	
	,, (1959, including separates)	251 10 6	
			273 17 6
– – –	,, Books	13 12 0	
– – –	,, Bookbinding	86 6 0	
8 8 0	,, Periodicals	8 10 0	
1 0	,, Rent (of Library Room)	1 0	
– – –	,, Fire Insurance (Library) (1960 and 1961)	7 18 4	
25 0 0	,, Cataloguing of Library Books	– – –	
			116 7 4
	,, Subscriptions :		
6 4 0	Other Societies	11 10 6	
3 5 0	South Western Naturalists' Union	3 9 0	
– – –	Steep Holm Trust (1959 and 1960)	13 10 0	
			28 9 6
14 10 6	,, Fares and Expenses of General Meetings		7 8 0
1 1 9	,, Loss on Dinner		1 9 0
60 0 0	,, Grants to Sections :		
	Botanical	15 0 0	
	Entomological	15 0 0	
	Geological	15 0 0	
	Ornithological	20 0 0	
	Junior	10 0 0	
			75 0 0
– – –	,, Window display		1 2 6
577 12 10			666 9 7
	,, Balances to next Account :		
20 2 6	Cash at Bank	88 9 10	
108 1 1	*Deposit in Post Office Savings Bank	112 16 9	
200 0 0	£200 5% Defence Bonds	200 0 0	
34 7 0	In hands of Field Committee	37 8 5	
			438 15 0
	*Including Centenary Reserve £88 16s. 6d.		
£940 3 5			£1,105 4 7

Audited and found correct,
A. E. BILLETT, *Hon. Auditor,*
18 January, 1961

REPORT OF BOTANICAL SECTION 1960

AT the Annual Business Meeting held in the Physiology Lecture Room of the University on January 11 the following officers were elected: President, Mr. I. W. Evans; Secretary and Treasurer, Mr. R. F. Wills; Committee: Mrs. G. S. Wakefield, Miss A. M. Sampson, Dr. A. F. Devonshire, Mr. F. W. Evens, Mr. J. A. Eatough and Mr. H. F. Howard.

The Wild Plant table at the Bristol Museum has been much appreciated during the year and we offer our sincere thanks to Mr. A. Warhurst and Mr. P. F. Bird of the Museum and to Mrs. G. S. Wakefield, Mr. Ivor Evans and to all our members who have contributed specimens.

Special mention should be made of the following two events. On June 18 the Section enjoyed a trip to the Wiltshire Downs led by Mr. G. W. Collett of the Wiltshire Archaeological and Natural History Society. Several of their members joined the party and over twelve different species of orchids were seen. On February 8 more than 200 members and friends attended a meeting to hear Mr. G. T. Goodman from Swansea and to see the film *Between the Tides*. This was without doubt the largest audience ever in the history of the Section.

During the year the following Winter meetings were held:

Jan. 11: Annual Business Meeting, followed by colour transparencies of flowers by Mr. J. A. Eatough.
Feb. 8: Coastal Vegetation of South Wales by Mr. Gordon Goodman and the film *Between the Tides*.
Mar. 14: The Classification of Grasses and the British Species. Mr. C. E. Hubbard, O.B.E.
Apr. 11: Summer Field Programme meeting.
Oct. 10: Short papers and slides by members of the Section.
Nov. 14: Shrubs for Scent and Colour. Mr. Eric W. Hobbis, M.B.E.
Dec. 12: Joint Meeting with the Entomological Section. *Behind the Scenes*, a film by Mr. C. E. Bell, and colour slides of flowers by Mr. J. A. Eatough.

The following field excursions took place under the leadership of those shown.

Apr. 30: Purn Hill and Uphill. Dr. A. F. Devonshire.
May 21: Westonbirt. Mr. P. J. M. Nethercott.
June 18: The Wiltshire Downs. Mr. G. W. Collett.
July 9: Chew Valley Reservoir. Mr. R. F. Wills.
Aug. 21: Steart. Mr. J. Morley (Warden for the Nature Conservancy for Somerset).
Sept. 3: Claverton and Warley Woods. Mr. H. F. Howard.

In addition, evening walks were taken as follows:

Mangotsfield and Warmley. Mr. I. W. Evans.
Durdham Down. Miss A. M. Sampson.
Gordano Valley. Mr. R. L. Jefferies.
Frenchay and Hambrook. Mr. I. W. Evans.
Bath Botanical Gardens. Mrs. G. S. Wakefield.
Bracken Hill Botanical Gardens. Mrs. G. S. Wakefield.

Five indoor meetings were held in the Botany Lecture Theatre on the following dates: May 2, May 23, June 20, Aug. 22 and Sept. 5, when specimens collected on field excursions were brought in for identification.

R. F. WILLS, *Hon. Secretary.*

REPORT OF GEOLOGICAL SECTION 1960

At the Annual Business Meeting held in the Geology Department of the University on January 12, 1961, the following officers were elected :— President, Dr. J. W. Cowie ; Vice-President, Mr. C. E. Leese ; Hon. Secretary, Mr. R. G. Payne ; Field Secretary, Mr. V. D. Dennison ; *Ex-Officio*, Professor W. F. Whittard and President of Students' Geological Society ; Committee, Mrs. G. S. Wakefield, Miss L. Carlton, Mr. R. Bradshaw, Dr. M. L. K. Curtis, Mr. A. C. K. Fear, Mr. T. R. Fry, Mr. I. G. Lennon, Dr. F. C. Phillips, Dr. R. J. G. Savage, Mr. W. Stock, Mr. D. Vowles, Mr. H. A. Wilmott.

During 1960 the Committee met twice, on January 14 to make proposals for officers and on January 28 to arrange Summer and Winter Programmes. The Annual General Meeting was held on January 14, when reports were read and officers elected. The Annual General Meeting was followed by an illustrated talk on British Guiana, given by Mr. R. Bradshaw, M.Sc.

There were five lecture meetings of the Section during the year :—

Feb. 11 : Dr. A. J. Lloyd—Geology of the Neuchatel Juras.
Mar. 11 : Mr. C. W. Green, M.A.—Mineralisation of the Mendips.
Oct. 27 : Mr. L. G. Brown, B.Sc.—The Physical Geology of the Granite of S. W. England.
Nov. 24 : Mr. D. Hamilton, M.Sc.—Some aspects of New Zealand Geology.
Dec. 8 : Professor S. W. Wooldridge, F.R.S.—South East England and the Bristol District—a Physiographic Comparison.

The first four lectures were held in the Geology Department of the University, and the Section would like to record its thanks to Professor Whittard and its indebtedness to the University for making the premises freely available for these activities.

The December lecture was held in the Geography Department of the University, and the Section would also like to thank Professor Peel for helping to make this very protracted meeting so highly successful.

The Section takes pleasure in recording the distinction, Doctor of Science, bestowed on Dr. D. T. Donovan by the University of Bristol.

During the year Council debated the advisability of including Archaeology within the scope and activities of the Society. It was decided by a Sub-Committee of Council that there was no case for creating a separate Archaeological Section, but that any inherent interest among members of the B.N.S. should continue to be satisfied by occasional lectures and outings which should include some archaeology. Mr. A. Warhurst, Director, City Museum, subsequently offered to help train any members from the Section who wished to pursue the subject further. The Section would like to record its thanks for this generous offer.

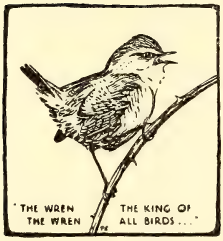
At Easter, Mr. Leese again led a party to Cornwall, a larger one this time centred on Port Isaac. The zeal and drive of our youthful President allowed the party to cover a wide range of topics including the volcanics of Port Isaac and the metamorphosed volcanics of Trebarwith: the metamorphic aureole around Camelford : the industrial and mineralogical aspects of the China Clay industry of St. Austell : the quarrying for granite and associated ore deposits in the Pendeen district : the complex folding of the culm and upper Devonian around Tintagel and Boscastle and the Pleistocene peneplanation of the Delabole area. This admirably planned trip was excellently led and proved to be another great success.

There were six Field Meetings during the Summer as follows :—

April 9 : Bridgwater Dist. (including Burtle Beds); leader Dr. R. J. G. Savage.
May 28 : Cotswolds ; leader Dr. J. W. Cowie.
June 25 : South Wales ; leader Mr. R. Bradshaw.
July 23 : Aust District ; leader Mr. R. G. Payne.
Aug. 13 : Portishead ; leader Mr. T. Fry.
Sept. 24 : Farringdon and Swindon ; leader Mr. R. G. Payne.

R. G. PAYNE, *Hon. Secretary*.

REPORT OF ORNITHOLOGICAL SECTION
1960



AT the 36th Annual Business Meeting in January, Mr. George Sweet was elected President in succession to Mr. G. E. Clothier. Mr. S. M. Taylor was re-elected Hon. Secretary, and Miss D. Crampton and Messrs. P. J. Chadwick, H. H. Davis, and G. A. Forrest were re-elected to the Committee. Miss F. Wareham and Mr. H. W. Neal retired, and Mrs. G. Buxton and Mr. J. D. R. Vernon were elected to succeed them. The Editorial Committee, comprising Messrs. P. J. Chadwick, H. H. Davis, R. H. Poulding and M. A. Wright, was re-elected.

During the year the following meetings were held :

Jan. 14 : Annual Business Meeting. Colour film of the B.O.U. Centenary Expedition to Ascension Is., shown by Mr. N. P. Ashmole.

Feb. 5 : Our Marshland Birds, Past and Present, by Mr. R. C. Homes.

Feb. 26 : Symposium on Bird Protection. Messrs. P. Brown, P. J. Conder and G. Waterston, of the R.S.P.B.

Apr. 22 : Informal and Exhibition Meeting.

Oct. 5 : Birds of the Southern Irish Sea, by Mr. H. Dickinson.

Nov. 15 : Annual Field Programme Meeting. Talks on Breeding Birds of S. Uist, by Mr. P. J. Chadwick, and on Wader trapping on the island, by Mr. J. D. R. Vernon.

Dec. 2 : Fair Isle and its Birds, by Mr. G. Waterston.

Attendance at the six formal meetings averaged 81, ranging from 30 for the first meeting (when the snowy weather made travelling difficult) to 138 for the last. Mr. Waterston's talk in December was outstanding among the series of notable lectures we have had in recent years.

Three evening field walks and one afternoon walk were held in the Spring. to Marshfield, Backwell Hill, the coast at Clevedon, and the coast from Aust to Littleton. Leaders were : Messrs. A. E. Billett, G. E. Clothier, T. B. Silcocks and S. M. Taylor. 36 members took part in an all-day visit to Steart in May.

Co-operative fieldwork included a third year of the breeding-season Shelduck study and participation in the B.T.O.'s Nest Record and Ringing Schemes. Members also contributed to the B.T.O. Lapwing Survey and Road Deaths Enquiry.

The eleventh Fieldwork Review was published during the year ; it covered work in 1959, including the breeding season surveys of Lapwing and Shelduck. Its principal contents comprise an important account by Mr. Hugh Boyd of 'The Present Status of the Mallard in North Somerset'.

S. M. TAYLOR, *Hon. Secretary.*

REPORT OF JUNIOR SECTION 1960

AT the Annual Business Meeting held on January 22, the following Members' Committee was elected :—Timothy Lait (Chairman), Jack Read (Vice-Chairman), Elizabeth Bridges (Hon. Secretary), Stephen Locke (Assistant Secretary), Stephanie Sweet, Penelope Welch, Nigel Webb and Richard Ashley.

Special mention should be made of a visit in April by 16 members accompanied by 6 adults to Holland and the Island of Texel. Three days' bird watching on the island proved very successful ; several reservoirs were visited and nesting Spoonbills, Avocats, Blacktailed Godwits and many other interesting species were seen. Our party met several well-known Dutch ornithologists who accompanied us in the field and visited us in the Hostel at Den Burg. Afterwards, visits were made on the mainland to the bulb-fields which were in full bloom. The Keukenhof Gardens, the Rijksmuseum at Amsterdam, the Frans Hals Museum at Haarlem, the Mauritzhuis at The Hague and many other places of interest were also visited.

An Exhibition and Field Work Competition were held on Oct. 8 in the Museum School Room by kind permission of Mr. A. Warhurst ; a large variety of exhibits was shown and prizes were received by the following :—Section prizes : 12-14 years, Nicholas Bristowe, study of Cabbage White Butterfly ; over 14 years, Tony Diamond, Hedge Sparrow, which included some excellent drawings. President's prize : Timothy Lait, illustrated study of Lapwing. Maxwell Knight's prize : Alisa Pippen, a collection of seeds and fruits. Judging of the competition was by Dr. R. J. G. Savage.

The following indoor meetings were held :—

Jan. 2 : New Year Party.
Jan. 22 : Annual Business Meeting.
“ Bird Haunts in the West Country.” Mr. H. Savory.
Feb. 19 : “ Oases of the Sahara.” Dr. R. J. G. Savage, B.Sc., Ph.D.
Mar. 4 : “ Setting up Butterflies and Moths.” Miss A. E. Bennett, B.Sc. and Mr. P. F. Bird, B.Sc.
Mar. 25 : “ Sand Dunes.” Mrs. E. W. Yemm, B.A.
Apr. 8 : “ Setting out Seaweed.” Miss A. E. Bennett, B.Sc.
Sept. 23 : “ Seashore Animals.” Mr. R. Bassindale, M.Sc.
Oct. 8 : Exhibition and Competition.
Nov. 4 : “ British Forestry and the Naturalist.” Dr. C. A. Connell, O.B.E., M.A.
Nov. 19 : Social afternoon with colour films.
Dec. 16 : “ Texel and Holland.” Junior Members.

Field meetings were as follows :—

Jan. 23 : Blagdon Reservoir. Leader—Mr. B. King.
Feb. 20 : Wild Fowl Trust. Leaders—Mr. B. King and Mr. G. Sweet.
Mar. 5 : Cardiff Museum. Leader—Mr. B. King.
Mar. 19 : Chew Valley Reservoir. Leader—Mr. R. F. Wills.
Apr. 20-30 : Texel and Holland.
May 15 : Kellaway Rocks. Leaders—Mr. Stenhouse Ross and Mr. R. G. Payne, B.Sc.
May 21 : St. George Wharf. Leader—Mr. H. H. Davis.
June 4-5 : Shapwick Heath and Dunkery Beacon. All night. Leader—Mr. R. F. Wills.
June 18 : Newton Park. Leader—Mr. P. F. Bird, B.Sc.
Aug. 11 : Mendips. Leaders—Mr. H. Savory and Mr. R. F. Wills.

Aug. 17 : Leigh Woods. Leaders—Miss A. E. Bennett, B.Sc. and Mr. P. F. Bird, B.Sc.
Sept. 1 : Cheddar Reservoir. Leaders—Mr. and Mrs. R. F. Wills.
Sept. 25 : Lynmouth. Leader—Mr. R. Bassindale, M.Sc.
Oct. 9 : Blagdon Reservoir. Leader—Mr. H. H. Davis.
Nov. 13 : Chew Valley Reservoir. Timothy Lait.
Dec. 4 : Chew Valley Reservoir. Mr. B. King.

This opportunity is taken to remind members of other Sections that they are of course entitled to attend the Junior Section's lectures and join their Field Meetings.

The presence and interest of more adult members would be appreciated.

DORA WILLS, *Hon. Secretary, Advisory Committee.*

ELIZABETH BRIDGES, *Hon. Secretary, Members' Committee.*

ACCOUNT OF THE GENERAL MEETINGS

1960

THE 97th Annual General Meeting was held on January 21, when the Officers and Members of Council were elected. Dr. F. Coles Phillips was elected as President, Miss M. H. Rogers having completed her time of office. Dr. F. S. Wallis, on his departure from Bristol, and Mr. F. W. Evens were elected Honorary Members. Members stood in memory of the late Mr. A. H. Peach who had been Treasurer for 20 years. The retiring President gave her Presidential address on "A Naturalist in California ". It was beautifully illustrated with colour slides, mostly taken by Miss Rogers herself. San Francisco, the Yosemite Valley, the Monterey coast, and the Redwoods were all shown.

On March 3, Dr. Bruce Campbell lectured on "A Naturalist in Poland ". Coloured and black and white slides were shown both of the countryside and of nests of various birds, some of whose songs were reproduced on tape-recordings. The lecturer also spoke of many of the botanical specimens seen on the trip.

Miss P. M. Jenkin of the Zoology Department of Bristol University gave us an interesting and detailed lecture on Flamingos on October 6. She referred to the Greater, the Lesser and the Andean Flamingo. By diagrams, photographs and explanation, we were shown how the bill structure, varying in different types according to the type of food, was adapted for feeding.

On Thursday, November 3, Mr. H. G. Hurrell again visited us, to talk this time on birds and animals, wild and tamed, round his home at Moorgate on Dartmoor. He started with his film of the Grey Seal which he has kept in his swimming pool for about a year ; this film included otters and a tame razorbill. We also saw pictures of a kestrel, caught and trained to fly from the wrist. But perhaps outstanding was his film of foxes, adult and cubs, at their earth.

Our former President, Professor W. F. Whittard, came to us on December 1 and lectured on " The Geology of the Sea-bed ", illustrated by slides and a film. We were shown the methods employed in carrying out this very difficult work, and given some idea of the highly technical and sensitive instruments used. Pictures of the sea-bottom up to a depth of 3 miles were shown.

Although not a general meeting, some reference should be made here to the Society's venture in co-operating with the R.S.P.B. to show their film " Sea-bird Summer ". This was a great success. The Colston Hall was very nearly full, and a useful profit was available for both Societies.

A. C. LEACH, *Hon. Secretary.*

GENERAL FIELD MEETINGS

SIXTEEN general field meetings took place during the year, the highest total so far. Four evening meetings were held, and again proved popular. The most ambitious meeting of the year was the one to South Brent, Dartmoor, where we were met by the well-known naturalist, Mr. H. G. Hurrell, who showed us some of the natural history and antiquities of Dartmoor and also his animals including the grey seal.

A brief summary of the meetings under the leadership of those named is given below, and a much fuller account is kept in the records of the Field Section.

Jan. 9 : Kilve. Mr. H. G. Hockey, Mr. R. G. Payne, and Mr. T. V. Silcocks.
Feb. 7 : Shepherdine. Mr. D. A. C. Cullen.

Mar. 6 : Slimbridge. Mr. B. King.
Mar. 20 : Uleybury Camp and Nympsfield. Mr. A. C. K. Fear.
Apr. 2 : Bury Wood and Colerne. Miss C. Groves.
May 7 : Lord's Wood. Mr. D. A. C. Cullen.
May 25 : Inglestone Common. Mr. C. L. Bell.
June 8 : Meare. Mr. H. G. Hockey and Dr. A. F. Devonshire.
June 12 : Swyre Head and Nine Barrow Down, Isle of Purbeck. Mrs. G. H. Dudden and Dr. A. F. Devonshire.
June 21 : Wickham Glen and Frenchay. Mr. H. G. Hockey.
July 4 : Christon Hill. Mr. H. G. Hockey and Mr. H. F. Flook.
July 16 : Dartmoor. Mr. H. G. Hurrell and Mr. H. G. Hockey.
Aug. 27 : Malvern Hills. Mr. H. F. Flook.
Sept. 11 : Caractacus Stone and Tarr Steps, Exmoor. Mr. H. G. Hockey.
Oct. 23 : St. Audries, Quantocks. Mr. A. L. Wedlake, Major J. H. Dowling and Mr. H. G. Hockey.
Nov. 20 : Litton and Blagdon reservoirs. Miss C. Groves.

A. F. DEVONSHIRE, *Hon. Field Secretary.*

HON. LIBRARIAN'S REPORT

1960

THE serious overcrowding of the Library has been alleviated by the transfer of the following periodicals to the University Library in Queen's Building, University Walk :—

1. All American publications, except Natural History.
2. Bulletins and Memoirs of the Belgian Museum of Natural History.
3. Memoirs of the Royal Institute of Natural Sciences of Belgium.
4. British Association for the Advancement of Science (up to 1940).

A re-arrangement of the books and periodicals still remaining in the Society's Library in the City Museum is in progress.

A number of reprints and books have been given to the Library and thanks are due to the donors, especially to Mrs. H. H. Davis who presented several volumes of " Watsonia " and to Mr. I. W. Evans for the gift of " Nature's Garden ".

The New Naturalist Series has been brought up to date by the purchase of the last seven volumes.

150 books and periodicals were borrowed during the year.

R. BRADSHAW, *Hon. Librarian.*

OBITUARIES

ALEC HAMILTON PEACH

THE death of A. H. Peach on January 9, 1960, at the age of 85 years, deprived the Society of one of its best-known and most active members.

Peach probably rendered his greatest service to the Society as its Hon. Treasurer for 20 years (1939–59), during which period the membership increased from 239 to 666. Throughout this time he was an *ex-officio* member of Council and also served on the Publications and Library Committee. He was most assiduous in his attendance at meetings, and his successful management of the Society's finances was characterised by such great personal friendliness that members, all of whom he seemed to know intimately, must have felt it a pleasure to pay their subscriptions.

Peach had joined the Society in 1925, and his activities were not confined to the Hon. Treasurership. He was a keen and knowledgeable entomologist, was Secretary of the Entomological Section from 1940 to 1948 and its President from 1951 to 1953. In 1947 he compiled for these PROCEEDINGS " Records and Observations of Lepidoptera ". He was elected an Honorary Member of the Society in 1959.

Until his retirement Peach was manager of the Sun Life Assurance Office in Bristol. He had a number of interests ; for many years he was a churchwarden of All Saints, Clifton, and he was a Gilbert and Sullivan enthusiast and had been a good games-player.

The Society extends its sincere sympathy to his wife and family.

H.W.T.

MRS. C. I. SANDWITH

MY mother, Mrs. Cecil Ivry Sandwith, who died at her home in Clifton, on February 6, 1961, in her 90th year, was the elder daughter of the Rev. E. J. Huntsman, vicar of Harworth, Nottinghamshire, and widow of the Rev. E. P. Sandwith, who had succeeded him in that parish. A few years after the tragically early death of her husband, my mother came to live in Bristol in the autumn of 1909, for the education of her two sons at Clifton

College. Her keen interest in field botany soon brought her in touch with Mr. J. W. White, and she entered the circle of distinguished Bristol botanists of this period which was headed by White, Cedric Bucknall and Miss I. M. Roper, and was later joined by H. Stuart Thompson. Mr. White's friendship and guidance were invaluable at this time, when we were feeling our way about the district, starting our herbarium, and learning how to use botanical books. My mother contributed some notes to the *Flora of Bristol* (1912), the best being her record of *Carex divisa* from the salt-marsh below Cook's Folly which was destroyed by the construction of Portway.

The publication of the Flora opened a period of some 20 years of remarkable activity on the part of local field-workers who, in those days, were still cyclists and walkers. Many very important additions to the flora were made, the specimens being invariably shown and discussed at the meetings of the Botanical Section of this Society and, even more, at those round-table gatherings at Mr. White's house of the Botanical Club which had been founded by G. Brebner in 1903, under the wing of the University College. My mother was conspicuous among the recorders of those days: some of her better discoveries were those of *Juncus tenuis* and *Wolffia*, and of the tiny patch of *Andromeda* near the summit of Blackdown. Best of all, perhaps, was our find of *Ranunculus ophioglossifolius* on a West Gloucestershire common in June, 1926.

She began early to specialize in water-plants, particularly the *Charophyta*, which had a great attraction for her. She added *Tolypella intricata* and *Nitella translucens* to the local list, and in 1918 read a paper on this group which was published in these PROCEEDINGS in 1920. The genus *Ceratophyllum* next occupied her attention and her paper, "The Hornworts and their occurrence in Britain" (PROCEEDINGS, 1926), was a useful contribution to our knowledge of the taxonomy of British forms.

Throughout this period my mother had also cultivated a very different taste, for alien plants: there were constant visits to the city tips and docks, and by 1933 she had assembled and published the list of local species entitled "The Adventive Flora of the Port of Bristol" (see the Report of the *Botanical Society and Exchange Club of the British Isles*, for 1932). 717 adventive species were recorded in this list and, with the numerous additions that have since been made as the result of her continued collecting and the efforts of other workers, it is probable that not less than 1,000 aliens have been found in the area of the Port of Bristol. Very many of these plants are represented in our adventive herbarium, which is kept separate from the general collection.

In 1929, the British Association meeting was held at Cape Town, and my mother took advantage of my brother's presence in Northern Rhodesia to go out to South Africa and attend it. On the voyage out, and during the meeting and subsequent excursions to such places as Johannesburg and the Victoria Falls, she was accompanied by our member, Miss M. Bowen. After the meeting she journeyed northwards to stay with my brother on his farm in the Chilanga District, which at that time had been scarcely explored botanically, and during two months she made a collection of the trees, shrubs and grasses. The first set was presented to the Kew Herbarium, where it was identified, and her own smaller set has now been dispatched to the Southern Rhodesia Government Herbarium at Salisbury.

In October, 1932, Mr. White died, the meetings of the "Botanical Club" came to an end, and the Minutes Book has not, I believe, been traced. In June, 1935, Miss Roper also died and my mother was invited to continue Mr. White's " Bristol Botany " notes supplemental to his Flora which had appeared annually in these PROCEEDINGS. She gladly undertook this work for the next 26 years (since 1947 we have been joint authors) and during this period was the finder, or joint finder, of such additions to the flora as *Carex laevigata*, *Glyceria declinata*, the intergeneric hybrid grass × *Agrohordeum Langei* (which was new to Britain) and, only last summer, *Vulpia ambigua* on the Berrow dunes.

Besides the groups mentioned above, my mother was an assiduous collector of other critical genera, especially *Sorbus*, *Chenopodium* and *Potamogeton*. She enjoyed working with her compound microscope, a bent inherited from her father who was a descendant of Benjamin Huntsman, the inventor of cast steel. A few years before the last War she joined the British Bryological Society and became a keen student of Hepatics, adding a number of species to the North Somerset list from the peat moors. Her crowning discovery, in April, 1952, in her 81st year, was that of the saprophytic *Cryptothallus mirabilis* on Ashcott Heath, its second English station. This gave her great joy, and she cultivated specimens with continuous care during her remaining years and exhibited some at the meeting of the British Association in Bristol in September, 1955. The peat moors were our most precious hunting-ground for nearly half a century : we first visited Shapwick Heath in April, 1911, and repeated exploration of these moors very often produced something new and unexpected, in spite of distressing changes in the vegetation and the disappearance of some of the rare species.

My mother was an " all-round " character of extraordinary energy and diverse interests combined with a strong sense of duty and a deeply held faith. During the first World War she served for three years with the Patrols organized by the National Union of Women Workers, and often did a midnight beat at the Tramways Centre and Temple Meads Station. For over 40 years she cultivated her small property at Tickenham on the slope above Jacklands Bridge, learning to drive a car when over 60 years old. She had bought this property in April, 1920, and was able to evacuate herself there for strenuous horticultural work in the winter of 1940, when our flat in Clifton became uninhabitable. At the end of the last War she made a large collection of local grasses for the South-western Forensic Science Laboratory of the Home Office in Bristol.

She joined our Society in 1912, served on the Council in the years 1915–1918 and 1943–1946, and was elected an Honorary Member soon after the last-mentioned period. She had also been a member of the Botanical Society of the British Isles since 1915, and was elected a Fellow of the Linnean Society of London in May, 1949.

N. Y. Sandwith.

BRISTOL BOTANY IN 1960

By Cecil I. and N. Y. Sandwith

1960 WILL be remembered for the abominable summer and autumn in southern England. The total rainfall for the period July to November over England and Wales was unequalled since comparable records began in 1727. The bad weather began here on July 4th, and continued wet and stormy, with few breaks, for the next six months and well into the New Year. But we must not forget the pleasant spring and early summer, with several quite dry and sunny months, and conditions of drought at the end of a warm June. And the flowering and fruiting trees and shrubs, their buds well warmed in the previous summer and autumn, have rarely made such a splendid show.

The persistently wet summer weather kept botanists for the most part either indoors or within easy reach of their cars. However, we have our usual array of field-notes from various sources ; one native and two naturalized species of *Gramineae* were added to the flora of the district ; and a newcomer, Mr. Nicholas Jardine, of Monkton Combe School, has sent in some interesting records from the valleys and woods of his neighbourhood.

On Saturday and Sunday, September 17th and 18th, a very successful first Regional Meeting for the South West of the decentralized Botanical Society of the British Isles was held at Bristol, organized by the Department of Botany of the University. Saturday was devoted to a number of excellent papers read at the Department, followed by an exhibition and conversazione in the evening. The Sunday excursion to Brean Down and Berrow was much enjoyed, especially as this was one of the few cloudless sunny days of the last half of the year.

Through the kindness of Dr. W. A. Sledge, a considerable number of specimens from Miss I. M. Roper's herbarium at Leeds University was borrowed from the Department of Botany for the purpose of verifying certain unpublished manuscript records in her interleaved copy of White's Bristol Flora. Some errors have now been put right, while there were some interesting discoveries which deserved immediate publication in this year's " Bristol Botany ".

The names of our principal contributors are abbreviated as follows :—

P.F.H., P. F. Hunt
N.J., N. Jardine
D.M.S., Dr. D. Munro-Smith
P.J.M.N., P. J. M. Nethercott
I.M.R., Miss I. M. Roper (decd.)
N.W., Mrs. N. Wycherley

Thalictrum minus L. Still in very small quantity on the Glos. side of the Avon Gorge, *P.J.M.N.*

Ranunculus Ficaria L. var. *bulbifer* Albert (as " *bulbifera* ") in Albert et Jahandiez, *Cat. Pl. Vasc. Dept. du Var*, p. 7 (1908). By the Frome at Downend, **G.**, *D.M.S.* Laneside, Hanham, **G.**, 1923, *C.I.S.* and *N.Y.S.* Kenn Moor, **S.**, 1957, *G. W. Garlick.* Albert's name, validly published, antedates by many years Marsden-Jones's use of the same epithet in the varietal rank in 1935. In the subspecific rank the correct name is presumably subsp. *bulbifer* Lawalrée (as " *bulbiferus* ") in *Fl. Générale de Belgique, Spermatophytes*, vol. ii. fasc. i. 60 (1955). Prof. Clapham, in Clapham, Tutin and Warburg, *Flora of the British Isles*, identifies this taxon with the typical form of *R. Ficaria*, using the name var. *Ficaria*, but the identification of the Linnean type is evidently a subject for further investigation. The variety or subspecies with axillary " bulbils " (really tubers) and fewer, mostly infertile, carpels was, of course, well known to Mr. White (*Flora*, p. 120) as " not of very rare occurrence ".

Lepidium Smithii Hook. Oatfield, Christon, **S.**, 1918, *I.M.R.*, ms., and specimen in her herbarium.

Silene noctiflora L. Leighton, between Frome and Nunney, **S.**, *N.W.* (spn. in Herb. Brit. Mus.).

Montia fontana L. subsp. *chondrosperma* (Fenzl) Walters. Rough pasture, Bromley Heath, **G.**, *D.M.S.*, det. *S. M. Walters.*

Linum bienne Mill. Crook Peak, **S.**, *P.J.M.N.*

Trifolium scabrum L. Crook Peak, **S.**, *id.*

Rosa canina L. × *Sherardii* Davies var. *omissa* (Déségl.) W.-Dod forma *resinosoides* (Crép. ex Cott.) W.-Dod. One bush near Leap Bridge, Downend, **G.**, *D.M.S.*, det. *R. Melville.*

Sedum Forsterianum Sm., agg. Gorge between Rowberrow and Burrington Combe, **S.**, *J. I. Robbins.*

Callitriche obtusangula Le Gall. Pond, Downend, **G.**, *D.M.S.*, det. *J. E. Savidge.*

Epilobium lanceolatum Seb. et Mauri. Disused railway line near Monkton Combe, **S.**, 1959, *N.J.*

Œnanthe aquatica (L.) Poir. With *Œ. Lachenalii* C. C. Gmel. on Binham Moor, between Mark and Chapel Allerton ; also on Blackford Moor, **S.**, *C.I.S.* and *N.Y.S.*

Torilis nodosa (L.) Gaertn. Buckland Dinham, **S.**, *N.W.* (spn. in Herb. Brit. Mus.).

Galium erectum Huds., auct. Field, Ham Green, Pill, **S.**, 1912 ; and pasture near Glasshouse, Combe Down, Bath, **S.**, 1914, *I.M.R.*, mss., and spns. in her herbarium. In the *Kew Bulletin*, vol. 14, pp. 63-65 (1960), Mr. H. K. Airy Shaw has shown that Hudson's name is untenable for this taxon, for which he proposes the name *Galium capsiriense* Jeanb. ex Timb.-Lagr., pending the discovery of an earlier valid name. The type locality of *G. capsiriense* is in the Pyrénées Orientales, and the type specimen in the Toulouse Herbarium was sent on loan to Kew for examination by Mr. Shaw. A photograph of it faces p. 64 in his article.

Anaphalis margaritacea (L.) Benth. Bury Hill, Moorend, **G.**, *D.M.S.*

Senecio vulgaris L. var. *radiatus* Koch. Common at Downend and Frenchay, **G.**, *D.M.S.*

Cichorium Intybus L. Laverton Scrub, **S.**, *P.F.H.*

Taraxacum palustre (Lyons) DC. Marshy ground near Leap Bridge, Downend, **G.**, *D.M.S.*, det. *C. C. Townsend* (as *T. paludosum* (Scop.) Schl. ex Crép.).

Arbutus Unedo L. A well-developed, flowering, bush naturalized in a limestone crevice on the edge of a quarry, Leigh Woods, **S.**, *P.J.M.N.* For a record from the Glos. side of the Avon Gorge, see " Bristol Botany in 1942 ". Mr. White's suggestion (*Flora*, p. 414) that the wild trees of *Arbutus* at Killarney never exceed a height of 8-10 ft. needs correction, since it is well known that these trees often exceed 30 ft.

Anagallis foemina Mill. Lullington, near Frome, **S.**, *N.W.* (spn. in Herb. Brit. Mus.).

Veronica spicata L. subsp. *hybrida* (L.) E. F. Warburg. Leigh Woods, **S.**, one flowering plant in a locality which does not correspond with the station reported in 1912 (see " Bristol Botany in 1912 "; *Journ. Bot.* 1918, p. 47), *P.J.M.N.*

Euphrasia occidentalis Wettst. Plentiful on the dunes at Berrow, **S.**, *N. D. Simpson* and *B.S.B.I. Field Meeting.*

Orobanche Hederae Duby. Roadside bank at Writhlington, south-east of Radstock, **S.**, *P.F.H.*

Marrubium vulgare L. In quantity on Purn Hill, Bleadon, **S.**, *I.W. Evans.* Wrington Warren, and Canada Combe, Hutton, **S.**, 1921, *I.M.R.*, ms., in her interleaved copy of White's *Flora.*

Lamium hybridum Vill. Wayside and garden weed, Downend, **G.**, *D.M.S.*

Chenopodium ficifolium Sm. Bleadon and Cross, **S.**, *C.I.S.* and *N.Y.S.*

Polygonum minus Huds. With *P. mite* Schrank on a peat moor drove, Meare Heath, **S.**, *D.M.S.*

Juncus acutiflorus Ehrh. ex Hoffm. × *articulatus* L. (*J.* × *surrejanus*

Druce). Old peat cutting on Ashcott Heath, **S.**, 1959, *C.I.S.* and *N.Y.S.* The first published record for the district of this hybrid, which probably occurs elsewhere with the parents.

Lemna gibba L. In quantity in the river Frome at Stapleton, **G.**, *D.M.S.*

Potamogeton Berchtoldii Fieb. Pond, Charterhouse-on-Mendip, **S.**, 1959, *C.I.S.* and *N.Y.S.*, confirmed by *J. E. Dandy.*

Carex divulsa Stokes. Not uncommon near Monkton Combe, **S.**, 1959, *N.J.*

C. polyphylla Kar. et Kir. Roadside near Wellow, **S.**, 1959, *N.J.*

C. Hostiana DC. With *C. distans*, north of the Dundas Aqueduct, **S.**, 1959, *N.J.* An unexpected new station, in marshy ground by the Avon. The small clump of plants is straddled across a ditch marking the Somerset-Wilts. border. Two old Bath localities are cited in *White, Fl.*, p. 636.

Poa Chaixii Vill. In Ammerdown Park near Kilmersdon, **S.**, growing under semi-naturalized conditions in coppiced Oak-Ash-Hazel woodland, 1959, *N.J.*, det. *F. Perring.* New to the district and to Somerset. *P. Chaixii* is usually found obviously planted on private estates.

P. angustifolia L. Disused railway line near Monkton Combe, **S.**, 1959, *N.J.*, det. *F. Perring.*

Glyceria declinata Bréb. Wet field, Monkton Combe; and in marshy ground by the Avon north of the Dundas Aqueduct, **S.**, 1959, *N.J.*, det. *F. Perring.*

Vulpia ambigua (Le Gall) More. Abundant over a small area of fixed dune at Berrow, **S.**, *C.I.S.* and *N.Y.S.* Accompanying species are *Erodium cicutarium* (agg.), *Trifolium arvense*, *Sedum acre*, *Galium verum*, *Plantago Coronopus* and *Phleum arenarium*, while *V. ambigua* meets *V. membranacea* at one edge of the area where the ground rises with loose sand. This is a first record for the district and for the county of Somerset. The distribution of *V. ambigua* on the Berrow dunes now needs investigation.* Why has it not been noted there before ? There seems to be no evidence of deliberate introduction. This little plant is an annual which withers early and is quite inconspicuous by the beginning of June. It was recently (1955) recorded in abundance in a new station on Dawlish Warren, S. Devon, and Dr. A. J. Willis informs us that it has greatly increased in its N. Devon locality at Woolacombe, where it was first reported in

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* Now (May, 1961) known to be widespread on the Berrow dunes.—Ed.

1931. He suggests that recent climatic conditions may be favouring the appearance of *V. ambigua*.

Festuca heterophylla Lam. In a plantation of pine and larch near Longmead, Monkton Combe, **S.**, 1959, *N.J.*, det. *F. Perring*. New to the district and to Somerset. This species is recorded from private woods and shrubberies in several counties, especially in S. England, and is sometimes found growing near *Poa Chaixii*.

F. longifolia Thuill. Abundant on railway line between Limpley Stoke and Midford, **S.**, 1959, *N.J.*, det. *F. Perring*. There was one previous record, from Burnham (see " Bristol Botany in 1955 ").

ALIENS. Avonmouth Dock, **G.**, which provided so rich a harvest in 1959, had one of its most barren years, because of the wet and sunless summer combined with human interference. The only plant of interest worth noting was *Solanum sisymbriifolium* Lam.

Iberis umbellata L. Tip at Hambrook, and waste ground at Downend, **G.**, *D.M.S.*

Cerastium tomentosum L. " Snow-in-Summer ", a garden outcast, is now well established on St. Vincent's Rocks, **G.**, and at Redcliffe Bay, Portishead, **S.**, *P.J.M.N.*

Geranium Endressii Gay. Whatley, near Frome, **S.**, 1959, *N.W.* (spn. in Herb. Brit. Mus., det. *Dr. A. Melderis*). A garden plant.

Oxalis corniculata L. Roadside, Downend, **G.**, 1921, *I.M.R.*, ms., and spn. in her herbarium. This is the earliest collection in the district.

Trifolium spumosum L. Beautiful specimens of this rare alien are in Herb. *I.M.R.*, from St. Philip's Marsh, Bristol, **G.**, 1912, and Portishead Station-yard, **S.**, 1907, leg. *I.M.R.*

Valerianella coronata (L.) DC. St. Philip's Marsh, Bristol, **G.**, May 1912, *I.M.R.*, spn. in her herbarium, det. *N.Y.S.* New to Bristol. The specimen had been incorrectly identified as *V. rimosa* Bast. *V. coronata* is a Mediterranean species, allied to *V. discoidea* Loisel. which occurred at St. Philip's Marsh in 1916 (see *Adventive Flora of Port of Bristol*). The two taxa are sometimes treated as subspecies of the aggregate *V. coronata*.

Bidens frondosa L. Temple Street, and frequent in the area of Newfoundland Road, Bristol, **G.**, *I. W. Evans*.

Senecio squalidus L. Portishead, **S.**, 1904, *W. Hosking* in Herb.

Brit. Mus., fide *D. H. Kent* in *Proc. B.S.B.I.* vol. 3, p. 377 (1960). The earliest record for Portishead and for the Somerset side of the area.

Cicerbita macrophylla (Willd.) Wallr. Chantry, near Frome, **S.**, *N.W.* (spn. in Herb. Brit. Mus.).

Scorzonera hispanica L. Grassy slope of Brean Down near the car-park, **S.**, *R. A. Graham*, *R. M. Harley* and *D. Lewis*, in *Proc. B.S.B.I.* vol. 3, p. 413 (1960).

Cuscuta approximata Bab. On *Achillea Millefolium*, " mouth of the Avon near Bristol ", comm. Feb. 1907, *I.M.R.*, in Kew Herb. (as *C. Epithymum* Murray), det. *T. G. Yuncker* (the monographer of the genus) in April, 1926. This is presumably the Dodder recorded as *C. Epithymum* " on Yarrow at Portishead ", **S.**, 1906, *Miss Roper* in *White, Fl.*, p. 426. Dr. W. A. Sledge informs us that a corresponding sheet in the cover of *C. Epithymum* in Herb. *I.M.R.* is labelled " Waste ground, Portishead, Somerset, Aug. 1st, 1906, on *Achillea Millefolium* " ; and there is a pencilled query on the sheet. *C. approximata* is new to Bristol. It is a native of Central Asia, in the same group of species as *C. Epithymum*, from which it differs in the more fleshy corollas with obtusish lobes about equalling the tube. The species was described by Babington from plants found growing in England, introduced with seeds of Lucerne (" Bokhara Clover ").

Verbascum pulverulentum Vill. Roadside, Nunney, near Frome, **S.**, 1959, *N.W.* (spn. in Herb. Brit. Mus., det. *Dr. A. Melderis*). New to the district.

Veronica filiformis Sm. Orchardleigh and Hemington churchyards, north of Frome, **S.**, *P.F.H.*

Amaranthus graecizans L. subsp. *sylvestris* (Vill.) Brenan. Portishead, **S.**, Sept. 1914, *I.M.R.*, spn. in her herbarium, det. *J. P. M. Brenan.*

Polygonum cuspidatum Sieb. et Zucc. Roadside ditch, Blackford, near Wedmore, **S.**, *N.Y.S.*

Brachypodium distachyon (L.) Beauv. and *Aegilops cylindrica* Host were both collected at Avonmouth Dock, **G.**, in 1958, by *Miss M. McCallum Webster* (spns. in Kew Herb.). The former was collected there in 1937, see *B.E.C.* 1937 *Rep.*, vol. xi. p. 520 ; the latter in 1928, see *Adventive Flora of Port of Bristol.*

Adiantum capillus-Veneris L. In a crack in the stonework round the great Roman bath, Bath, **S.**, 1950 and still there, *Mrs. M. J. Oldaker.*

BRISTOL BIRD REPORT
1960

COMPILED BY THE EDITORIAL COMMITTEE OF THE
B.N.S. ORNITHOLOGICAL SECTION

P. J. CHADWICK   R. H. POULDING
H. H. DAVIS   M. A. WRIGHT

THIS issue contains the more important records for 1960. It is the twenty-fifth of the series and is the result of contributions by well over ninety observers. Records received but not included will, as usual, be filed, and contributors are again requested to help in the preservation of these by using the appropriate 6″ × 4″ record cards.

Noteworthy reports from Chew Valley reservoir are of a marked increase in the breeding population of Gadwall and Tufted Duck ; a Sandwich Tern in the second week of March ; a Savi's Warbler in late July ; Wood Sandpipers and a Curlew Sandpiper on autumn passage ; and a Marsh Harrier in October. Water Pipits were seen at Chew Valley in all months January – April and October – December, and at Cheddar in March and November. Other reservoir records include the breeding of Gadwall at Blagdon and the presence of at least six Great Northern Divers at Cheddar in December.

During January to early April three Lesser White-fronts and up to eight Greenland White-fronts were seen among the many White-fronted Geese on the New Grounds, and a single Greylag made a short stay in March. From the same area are records of a Kentish Plover in April ; a Red-breasted Merganser (always scarce on Severn) in April – May ; an Avocet in May ; a White-winged Black Tern among a large passage of Black Terns in late August; and the exceptional number of 61 Little Stints on the second day of October.

Records of special note from other localities are of a Red-throated Diver on the river at Sheperdine in January ; a Shorelark at Severn Beach, January – March ; a Hoopoe at Compton Dando in June ; the breeding of Quail at Marshfield ; a Great Skua offshore near Sand Point in September ; an Alpine Swift at Portishead in early October, and, in the same month, a Richard's Pipit on Brean Down and a Dartford Warbler on the coast near Walton-in-Gordano. Thirty-seven Water Rails were counted in *Spartina* at

Sand Bay on the last day of January and an unusually high count of 86 Black-tailed Godwits was reported from Weston Bay in late September.

Observations on Steep Holm by members of the Gull Research Station during the first ten days of October included those of two Stock Doves, a Short-eared Owl, two Stonechats, and two Common Scoters off the landing beach, while a juvenile Woodlark, an adult female Pied Flycatcher and a male Firecrest were trapped and ringed. Of these species only the Pied Flycatcher had been previously recorded for the island.

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The area covered is that part of Gloucestershire (**G**) lying east of the Severn and south of a line from the New Grounds to the County boundary at Tetbury, and Somerset (**S**) north of the R. Axe and a line from Wells to the County boundary near Frome. For the purpose of this Report the area extends westwards into the Channel and Estuary to include the promontory of Brean Down, and the islands of Steep Holm and the Denny (cf. Sketch Map, *Proc. B.N.S.*, 1947, p. 225).

GREAT NORTHERN DIVER *Gavia immer*

S. One, Blagdon res., Jan. 23–Mar. 13 (R.B., C.M., W.L.R. *et al.*). Up to three, Cheddar res., during November (R.A., G.G.C., G.S. *et al.*) and up to six, an exceptional number for any Somerset reservoir, in December (R.M.C., J.A.McG. *et al.*).

RED-THROATED DIVER *Gavia stellata*

G. One on river, Sheperdine, Jan. 6 (H.J.B.).

S. Single bird, Cheddar res., Mar. 20–Apr. 17 (B.K., M.A.W., M.G.W. *et al.*).

GREAT CRESTED GREBE *Podiceps cristatus*

S. Usual numbers at reservoirs : max. counts of 47, Cheddar, Mar. 27, and of 31, Dec. 10 (B.K. *et al.*); 29, Blagdon, Apr. 17 (P.J.C.) ; and 18 pairs, Chew Valley, May 21 (B.K.). Very poor breeding season : no young seen, Chew Valley (B.K. *et al.*), and only one brood reported, Blagdon–pair with two young, July 8 (W.L.R.).

BLACK-NECKED GREBE *Podiceps nigricollis*

S. Two, Blagdon res., Oct. 16 (B.K.B.) and one, Chew Valley res., Nov. 13 (Jnr. Sect.).

LITTLE GREBE *Podiceps ruficollis*

G. Pair with young in reed-beds, Littleton-upon-Severn, Aug. 1 (P.J.C.).

S. At least five pairs bred, Chew Valley res. (G.B., B.K., W.J.S.). Adult with young, Charterhouse lead-mining pits, July 9, 16 (T.B.S.).

GANNET *Sula bassana*

G. First-winter bird found on coal lorry, Charfield Station, Oct. 14 ; kept for a week at Wildfowl Trust, then ringed and released, Kingston Seymour (Som.), on 21st (H.J.B., M.A.O.).

S. Dead adult on riverbank, Axe Estuary, Aug. 14 (R.A.).

CORMORANT *Phalacrocorax carbo*

S. Numerous coastal and inland records (various observers). Breeding colony on Steep Holm not surveyed in detail : 25 soaring in close flock over north cliffs at dawn, Oct. 7 (Res. Stn.).

HERON *Ardea cinerea*

S. Only three heronries located: 22 or 23 nests, Uphill Grange, Apr. 20 (W.L.R.) ; three nests, Park Wood, Newton St. Loe (nr. Bath), Apr. 24 (R.J.L.) ; and four nests, Brockley Combe, May 7 (W.J.S.)—a marked decrease on previous totals.

MALLARD *Anas platyrhynchos*

G. and **S.** Counts from the New Grounds and St. George's Park lake, Bristol, the four main N. Somerset reservoirs and most of the N. Somerset coastline, indicate that the population was at its peak in mid-January (*c.* 4,000 counted). Late summer/autumn counts generally well below this figure, but total of *c.* 3,500 noted, late September (various observers). Largest numbers recorded at New Grounds—1,660, Jan. 16 and 1,990, Sept. 23 (per H.J.B.), while Chew Valley res. held bulk of reservoir population—786, Jan. 17 and 830, Feb. 14 (G.C.B., S.I.B.), with max. of 984, Sept. 24 (B.K.). Very few breeding records apart from Chew Valley where at least 46 broods located, May-July (P.J.C., B.K., G.S., M.A.W.).

TEAL *Anas crecca*

G. and **S.** Max. numbers present in early January—*c.* 1,500, Chew Valley on 2nd (B.K.), and 1,700, New Grounds on 3rd, but only 290 on 16th (H.J.B.). Less numerous in Sept.-Dec., with max. in late December when 1,250–1,500 in area (B.K.B., S.I.B., J.A.McG., R.M., T.B.S., K.B.Y. *et al.*).

GARGANEY *Anas querquedula*

G. One in W.T. enclosures, New Grounds, Feb. 20 ; three, same place, Mar. 21–May 21 ; another, early April-end June (L.P.A., M.D.) ; and one, Sept. 25–Dec. 31 (M.D.). Single males on Estuary nr. Frampton-on-Severn, Mar. 6 (L.P.A.) and Purton canal on 20th (A.C., R.V.C.).

S. Pair, Blagdon res., Mar. 13 (P.J.C., R.S.H., M.A.W.) and a male, Apr. 25 (R.S.H.). Pair, Kingston Seymour, Mar. 31; two pairs there, Apr. 8 and a male, May 5 (W.A.H. *et al.*). Frequently reported, Chew Valley res., Apr. 3 to end Sept. (S.E.C., H.H.D. *et al.*) with six or seven ads. (3 ♂♂), July 17 (P.J.C.) ; brood of five, same place, July 1 (G.S.) ; and a female still present, Oct. 23 (B.K.).

GADWALL *Anas strepera*

G. Max. of 34, in W.T. enclosures and on Estuary, New Grounds, Jan. 1 ; 29 on 16th and 25, Feb. 15 (H.J.B.).

S. Increasing as a breeding species : five or six broods, Chew Valley res., June–Aug. (B.K., G.S. *et al.*) and pair with five ducklings, Blagdon res., July 13 (B.K.). Max. reservoir counts : Chew Valley—28, Jan. 10 (P.J.C., M.A.W.) ; 25, Aug. 29 (G.S.); 70, Sept. 18 but only 21, Nov. 13 (G.C.B., S.I.B.) and four, end Dec. (W.A.H., T.D.H.M.) ; Blagdon—six pairs, Mar. 13, Dec. 27 (P.J.C., M.A.W.); Cheddar—only one record, a pair, Dec. 29 (M.G.W.).

WIGEON *Anas penelope*

G. and **S.** Wintering population in area reached peak in mid-January : *c.* 3,700 counted, Jan. 17 falling to *c.* 2,900, Feb. 14—mainly due to decrease at New Grounds. Autumn totals much lower with max. of *c.* 2,100, mid-December (B.K.B., G.C.B., H.J.B., B.K., M.G.W. *et al.*).

PINTAIL *Anas acuta*

G. Reports from New Grounds : 167, Jan. 16, and 171, Feb. 15 (per H.J.B.).

S. Max. counts, Chew Valley res.—32, Feb. 7 (B.K.) and 41, Dec. 27 (W.A.H., T.D.H.M.) but usually less than 20 present. Also reported from Blagdon and Cheddar resrs., once from Barrow Gurney resrs. and Sand Bay, and twice from Weston Bay, but all counts of less than ten (J.F.B., C.L., J.A.McG., R.M. *et al.*).

SHOVELER *Spatula clypeata*

G. Max. count, New Grounds—84, Feb. 15 (per H.J.B.).

S. Only one coastal record. Counts from four main reservoirs: total of *c.* 250 throughout January increasing to 575, Feb. 14 but *c.* 600, Chew Valley on 21st ; only *c.* 125 on all waters, Mar. 13 but *c.* 420, Mar. 27, Apr. 3 ; rapid dispersal thereafter with summer population of *c.* 40 concentrated at Chew Valley, where at least five broods located ; *c.* 225, Nov. 13 (91, Blagdon ; 123, Chew Valley) and 315 at Chew, Dec. 27, 29 (various observers).

RED-CRESTED POCHARD *Netta rufina*

S. Three (2 ♂♂), Cheddar res., Nov. 20 (T.D.H.M.), 23 (W.L.R.).

SCAUP *Aythya marila*

G. One (imm. ♂), W.T. enclosures, New Grounds, Jan. 12–Apr. 2 (P.S. *et al.*) and adult (♀), Nov. 4–Dec. 31 (S.T.J. *et al.*).

S. Two or three, Weston Bay, end Feb.–mid-March (H.W.N., T.B.S.) and one (♂), Nov. 10 (J.A.McG.). Two, Yeo Estuary, Oct. 2 (T.B.S.) and one (♀), Chew Valley res., Oct. 30–Dec. 31 (G.B. *et al.*). One, Cheddar res., Nov. 13 (J.A.McG., M.G.W.) and four (1 ♂), Dec. 28 (W.A.H., T.D.H.M.).

TUFTED DUCK *Aythya fuligula*

G. Evening flight into W.T. enclosures, New Grounds, began, for first time, in December—176 counted on 31st, apparently coming from Frampton Gravel-pits (per H.J.B.).

S. Mainly found on the four major reservoirs, counts from which did not exceed *c.* 450 in total, Jan.–Mar., but reached *c.* 715, Oct. 16, Dec. 18 (B.K.B., S.I.B., S.E.C., M.G.W. *et al.*). At least 47 broods, Chew Valley res., July–Aug. (P.J.C., B.K., M.A.W.)—the most yet recorded.

POCHARD *Aythya ferina*

S. Total of 380 on the four major waters, Jan. 17—reduction of *c.* 1,600 on Dec. 1959 figure. Autumn totals of 970 (710 ♂♂), Oct. 16 with max. of *c.* 1,240 (975 ♂♂), Nov. 13 (G.C.B., B.K., J.A.McG., K.B.Y. *et al.*).

GOLDENEYE *Bucephala clangula*

G. Four (1 ♂) on Estuary, New Grounds, Apr. 24 (L.P.A.).

S. Max. reservoir counts: eight (2 ♂♂), Blagdon, Jan. 17 and eight (5 ♂♂), Feb. 14 (B.K.B.); seven (3 ♂♂), Cheddar, Jan. 17 and seven (1 ♂) on 24th (J.A.McG., M.G.W.); one, Barrow Gurney, Feb. 7 (W.J.S.), Oct. 23 (R.G., W.A.H.); 38, Chew Valley, Feb. 13 (B.K.) and 27 (10 ♂♂), Apr. 3 (P.J.C., M.A.W.) with max. in autumn of seven (1 ♂), Dec. 11 (R.S.H.). Single male, Weston Bay, Mar. 28 (R.A.).

COMMON SCOTER *Melanitta nigra*

G. One (♂), Severn Beach, Oct. 15 (R.E.H.).

S. One off Sand Point, Apr. 6 and pair on 22nd (T.B.S.). Party of four (3 ♂♂), Walton Bay, Clevedon, Apr. 7 (W.A.H.). Two (♀♀ or imms.) close inshore, Steep Holm, Oct. 3 (Res. Stn.). Two off Brean Down, Oct. 7 (E.G.H.) and three on 16th (P.J.C., B.S., M.A.W.). Single males off Sand Point, Nov. 6 (T.B.S.) and in Axe Estuary on 7th (R.A.).

RED-BREASTED MERGANSER *Mergus serrator*

G. One 'red-head' on the Estuary, New Grounds, Apr. 24, May 1 (L.P.A.).

GOOSANDER *Mergus merganser*

G. Male in flight over New Grounds, Feb. 24 (L.T.C.S.) and two on Estuary, Frampton, Dec. 25 (T.D.H.M.).

S. Very few records. Twice reported from Cheddar res.—single birds, Jan. 9 (R.M.C.), Mar. 20 (J.A.McG., M.G.W.). Max. of three, Chew Valley res., Jan. 16 (B.K.), 17 (G.C.B., S.I.B.); two, Jan. 24 (M.A.W.), Feb. 4 (B.C.) and single birds, Mar. 13 (G.C.B., S.I.B.), Apr. 17 (B.K.). Three, Blagdon res., Jan. 17 (B.K.B., T.D.H.M.), two in Feb. and one in March (R.S.H. *et al.*).

SMEW *Mergus albellus*

G. 'Red-head' in W.T. enclosures, New Grounds, Feb. 6–May 3 (per H.J.B.).

S. Present, Chew Valley and Blagdon resrs., Jan.–Mar. in very small numbers—max. of five 'red-heads', Chew Valley, Jan. 6 (S.G.M.) and six (2 ♂♂) on 12th (R.S.H.), and five (1 ♂), Blagdon on 21st (T.B.S.). One or two, both reservoirs, mid- to end December (B.K.B., S.K.T. *et al.*). Single 'red-head', Cheddar res., Mar. 27 (P.J.C., M.A.W.).

NORTH AMERICAN RUDDY DUCK *Oxyura jamaicensis*

S. Records from the reservoirs are undoubtedly of birds originating from the Wildfowl Trust. Up to seven (all males) noted during greater part of 1960—three, Blagdon and four, Chew Valley; in December, however, three females or immatures appeared at Chew (various observers) (cf. also *Rep. Som. Birds*, 1960).

SHELDUCK *Tadorna tadorna*

G. and **S.** Survey of coast between Sharpness and Weston-s-Mare by members of B.N.S. Ornith. Section showed about 490 full-grown birds present in early June. First young appeared about May 26 and max. count of young was about 190; majority found along Somerset coastline (per S.M.T.). Two pairs, Chew Valley res., Apr.–June—one of which ultimately seen with eight ducklings (B.K. *et al.*).

GREYLAG GOOSE *Anser anser*

G. Single bird with White-fronted Geese, New Grounds, Mar. 22–31 (H.J.B., M.D.).

WHITE-FRONTED GOOSE *Anser albifrons albifrons*

G. Increase at New Grounds from 1,500 at close of previous year to 3,000, Jan. 22 and 4,200, Feb. 21 ; 3,000 still there, Mar. 16—more than a third remaining to late date of 29th. Final departure (500 seen leaving) Apr. 1, but three birds stayed till 4th (W.T.). First autumn arrivals, same place—eight, Sept. 27, numbers increasing to 400, Oct. 2 ; 595, Oct. 28 ; 700, Dec. 1 and 800 on 21st (W.T.). Other Estuary records : nine flying up-river, Oldbury, Jan. 10, and 26 on similar course, Sheperdine on 16th ; 60 heading north at Stone—also on 16th (J.D.R.V.). Seventeen grey geese, probably White-fronts, overhead, Wick, Apr. 12 (D.R.H.).

S. Several parties, varying from four to seven birds, flying up-channel, Brean Down and Sand Point, Jan. 10 (P.J.C., R.K.N., T.B.S., M.A.W.) ; 50 or 60 on same course over Clevedon on 16th (P.F.). Single bird, Blagdon res., Jan. 17 (D.A.H., W.A.H.). Numbers from 20 to 39 frequently reported from Chew Valley res., mid-Jan. to end of March (R.M.C., B.K., B.S. *et al.*) ; 33 still there as late as Apr. 3 (P.J.C., T.D.H.M., W.J.S.).

GREENLAND WHITE-FRONTED GOOSE *Anser albifrons flavirostris*

G. Party of five ads., first noted at New Grounds in previous Dec., remained there to first few days of Apr. when number rose to seven; first-winter bird seen alone, same place, Mar. 12 (W.T.).

LESSER WHITE-FRONTED GOOSE *Anser erythropus*

G. At least three ads., New Grounds, in early part of year : one, various occasions, Jan. 27 to Mar. 16 ; another, Feb. 11 and 21 ; and a third from Feb. 7 to Mar. 19 (W.T.).

BEAN GOOSE *Anser fabalis*

G. One, New Grounds, Jan. 17 to Mar. 18 (P.S.) and one, Sept. 28 to end of year (R.M.C., M.D., B.K.).

PINK-FOOTED GOOSE *Anser brachyrhynchus*

G. New Grounds : first autumn arrivals, ten, Sept. 25, followed by gradual increase to max. totals of 107, Oct. 18, and 117, Nov. 30—with subsequent counts of 100, Dec. 27 and 80 on 31st (W.T.).

BRENT GOOSE *Branta bernicla*

G. One, dark-breasted form, *B. b. bernicla*, New Grounds, Oct. 1 to end of year (M.D., B.K., M.A.O.).

BARNACLE GOOSE *Branta leucopsis*

S. Four, sometimes five, seen by various observers, Chew Valley, early Jan. to third week of Feb. were perhaps the same party as reported from the reservoir in the previous Dec. B.K. records, however, that of four watched at close range on Feb. 7, three were carying W.T. rings. There must therefore be some doubt as to whether the Dec. 1959 records were of genuinely wild birds (cf. *Proc. B.N.S.* 1959, p. 29).

BEWICK'S SWAN *Cygnus columbianus bewickii*

G. Family of four, New Grounds, end 1959, stayed to Jan. 25 ; twelve in flight over W.T. enclosures, Feb. 21 ; one, mainly in enclosures, Nov. 8–Dec. 21, and family of five, Dec. 29–31 (H.J.B., M.D. *et al.*). Two on Estuary below Frampton, Dec. 25 (T.D.H.M.).

S. Twenty-nine present in area, Jan. 17 (6, Chew Valley : 23, Blagdon) but majority appear to have left by early Feb. and only six present at end of month. Next recorded at Cheddar res. —party of eight, Mar. 20 and identical number noted, Blagdon res. on 21st (B.K.B., D.A.H., R.S.H., C.L., B.K. *et al.*).

BUZZARD *Buteo buteo*

G. Single birds, Wick, Apr. 29 (D.R.H.) and Pilning, Nov. 19 (G.H.).

S. Breeding reported from Hutton (W.L.R.), nr. Priddy (T.B.S.) and Brockley Combe area (G.E.C.) ; other pairs located in breeding season at Blagdon (R.M.C., J.A.McG.), Rodney Stoke (J.A.McG.) and Litton area (R.S.H.).

MARSH HARRIER *Circus aeruginosus*

S. Female or immature, Chew Valley res., Oct. 22 (R.B., C.L.), 23 (B.K.).

HOBBY *Falco subbuteo*

G. One, New Grounds, Aug. 11 (L.P.A.).

S. Single birds, Bishop Sutton, May 8 (M.G.W.) ; Saltford, May 26 (B.K.) ; Chew Valley res., June 9 (P.J.C., G.S.), Sept. 4 (J.A.McG., M.G.W.) and 18 (R.S.H.) ; Sand Point, Sept. 11

(R.A.) ; Kingston Seymour, same date (C.E.R.) and Clapton-in-Gordano, on 12th (H.H.D.).

PEREGRINE *Falco peregrinus*

G. Single birds over Broadmead, Bristol, Feb. 23 (P.J.C.) and Slimbridge, Nov. 27 (E.L.J. per C.M.S.).

S. Single birds reported in coastal localities from Portishead to Brean Down during winter ; no evidence of breeding. One inland record : single bird, stooping at Buzzard *Buteo buteo*, Charterhouse, Apr. 19 (R.A.). Falcon, wearing bell and jesses, Brean Down, Nov. 26 ; seen again, Uphill, Dec. 29 (R.A.).

MERLIN *Falco columbarius*

G. One, New Grounds, Nov. 27 (E.L.J. per C.M.S.).

S. Male, and female or immature, Chew Valley res., various dates, Jan. 12–Apr. 2 (R.S.H., H.W.N., Jnr. Sect. *et al.*) ; one, same place, Oct. 23 (R.S.H.). Male, Sand Bay, Feb. 20 (R.K.N.) and a female, Oct. 13 (W.L.R.) ; single bird, same place, Dec. 11 (T.B.S.).

KESTREL *Falco tinnunculus*

S. First-year female ringed (369461), Steep Holm, Oct. 7, recovered *c.*35 m. S.S.E. at Thorncombe, Dorset, about a fortnight later (Res. Stn.).

RED-LEGGED PARTRIDGE *Alectoris rufa*

S. Two on perimeter path, Cheddar res., Mar. 27 (P.J.C., M.A.W.). Two on rough track, Uphill, Apr. 29 (R.A.) and two calling on Mendip (above Cheddar), June 20 (T.B.S.).

QUAIL *Coturnix coturnix*

G. One calling in oat crop, Hawkesbury Upton, May 22 (R.H.P.). Marshfield area : nest and eggs found during mowing operations in June (A.E.B.); one heard and seen, June 18 (R.M.C.) and two seen together flying low over corn crop, July 10 (B.K.).

S. One heard in cornfield, nr. Charterhouse, Mendip, June 7 (P.J.C.) and one calling persistently in mowing grass, Backwell Hill on 11th (R.H.P.).

WATER RAIL *Rallus aquaticus*

G. Two, Duchess' Pond, Stapleton, Jan. 7 (H.G.H.). One, R. Boyd, Wick, Mar. 11 (D.R.H.).

S. Seen in *Spartina* beds, Sand Bay, in considerable numbers, mid.-Jan. to early Apr. and Oct.–Dec. : max. counts (birds being driven out by the tide) of 37, Jan. 31 (E.M.P., T.B.S.); 28, Feb. 28 (T.B.S.) ; 14, Mar. 13 (C.M.) ; 26, Mar. 16, and 19, Nov. 20 (T.B.S.). Single bird on swampy ground nr. Stratton-on-the-Fosse, Jan. 31 (R.S.H.) and at pond, Charterhouse, Mendip, July 16 (T.B.S.). One, Chew Valley res., Feb. 13, and one, Nov. 5 (B.K.).

Coot *Fulica atra*

G. Single bird on the Estuary, Sheperdine, Oct. 28 (W.A.H.).
S. Exceptional winter counts, Chew Valley res., of 3,000 to 4,000, Feb. 13, 21 (B.K.). Peak numbers, between 2,000 and 3,000 or more, Cheddar res., Jan. and Dec. (J.A.McG., T.D.H.M., M.G.W.). One on Palace Moat, Wells, Apr. 6 (W.J.H.H.).

Oystercatcher *Haematopus ostralegus*

G. New Grounds : one, Jan. 14 (L.P.A.), three, May 12 and five on 24th (M.D.). Two, Oldbury, July 24 (J.D.R.V.) and single bird, R. Avon, Shirehampton, Aug. 28 (R.H.P.).
S. Up to 80, Weston Bay–Sand Bay area, Jan. 6–Mar. 14 (R.A., C.M., T.B.S.) ; 124, same area, Sept. 19 and 118, Dec. 28 (C.M.). Twelve feeding on Grammar School field, Weston-s-Mare, Jan. 23, Feb. 13 (T.B.S.). Single bird, Chew Valley res., Feb. 27 (B.K.).

Lapwing *Vanellus vanellus*

G. and **S.** Weather movements noted during cold spell, early January : 300—400 flying W., Sodbury Common, Jan. 9 (W.A.H., T.D.H.M.) ; *c.* 280, Chew Valley res., and *c.* 75 over Cheddar Gorge, moving S., Jan. 10 (P.J.C., M.A.W.) ; flocks totalling 800 birds or more, moving S.W., Weston-s-Mare area, same date, some rising to 1,500 ft. on reaching coast ; *c.* 80 birds, at great height, located only with aid of binoculars (R.K.N.). Max. coastal counts : *c.* 1,000 New Grounds, Nov. 12 (M.A.O.); *c.* 4,000, Axe Estuary, Dec. 19 (R.A.).

Ringed Plover *Charadrius hiaticula*

G. Fifty, Severn Beach, May 7 (P.J.C.) and 140, Oct. 18 (R.E.H.).
S. Up to 22, Chew Valley res., Aug. 6 – Oct. 2 (various observers). 63, Sand Bay, May 23 and 125, same place, Aug. 5 (T.B.S.). 400, Weston Bay, Aug. 26, and *c.*250, Oct. 4 (R.A.).

KENTISH PLOVER *Charadrius alexandrinus*

G. One on the Estuary, New Grounds, Apr. 4, seen by H.J.B. and J.K., who have supplied conclusive details ; third record for Gloucestershire.

GREY PLOVER *Charadrius squatarola*

G. Single bird, New Grounds, Apr. 16 (B.K.) and five, May 11 (M.D.). Nine, Sheperdine, Sept. 29 (W.A.H.) ; 17, Littleton, Oct. 27, and five, Aust, Nov. 13 (J.D.R.V.).

S. Up to six, Clevedon area, Jan. 17–Mar. 17 (P.J.C., W.A.H.) ; 35, same area, Oct. 9 (T.D.H.M.) ; 23, Axe Estuary, Sept. 29 (R.A.) ; 24, Woodspring Bay, Oct. 30 and six, Dec. 11 (T.B.S.).

GOLDEN PLOVER *Charadrius apricarius*

G. Thirty-seven, including eight of northern form, *C. a. altifrons*, nr. Frampton-on-Severn, Apr. 1 (L.P.A.). 60, nr. Berkeley, Nov. 26 (J.D.V.R.).

S. Coastal counts include : 85, Sand Bay, Feb. 2 (R.K.N.) ; 183, Weston Bay, Oct. 4 ; *c.* 1,100, Axe Estuary, Dec. 19 (R.A.). 100 inland, Marksbury, Oct. 30 (R.M.C.) and 310, Dec. 10 (B.K.).

TURNSTONE *Arenaria interpres*

G. Fifteen, Oldbury, Jan. 10 (J.D.R.V.) and 55, Apr. 10 (L.P.A.). Up to eight, New Grounds, May 11–21 and eight, July 23 (L.P.A.). Usual Severn Beach records (various observers).

S. Sixteen, Clevedon, May 12 (T.B.S.) and *c.*50, Weston Bay, Sept. 8 (R.A.).

JACK SNIPE *Lymnocryptes minimus*

S. Up to seven, Sand Bay, Jan. 3–Mar. 14 (R.K.N., T.B.S.) ; one, same place, Dec. 4 (T.B.S.). Four, Chew Valley res., Jan. 31, Feb. 14–21 (D.A.H., W.A.H., T.D.H.M.) and up to five, Oct. 9–Nov. 5 (R.S.H., B.K., J.A.McG. *et al.*).

WOODCOCK *Scolopax rusticola*

S. Undoubtedly more numerous in winter than records suggest. Single birds, Ebbor Gorge, Mendip, Mar. 20 (R.S.H.), Woodspring Bay, Oct. 16, Mendip Lodge Wood, nr. Burrington, Nov. 26 (T.B.S.).

BLACK-TAILED GODWIT *Limosa limosa*

G. New Grounds : single birds, Jan. 31 (L.P.A.) and Apr. 16 (B.K.) ; four, May 4; 18, July 21; nine, Aug. 6; 22, Oct. 28, Nov. 3; and up to nine, Nov. 13–17 (various observers). Ten, in summer plumage, nr. Sheperdine, July 17 (T.D.H.M.) ; two, same place, Oct. 7 (W.A.H.).

S. Unusually numerous on autumn passage. Yeo Estuary counts include : 19, Sept. 3 ; 35–40, Sept. 11–Oct. 16 (T.B.S.). Weston Bay : 16, Sept. 27 ; 86 on 29th ; 35, same place, Oct. 3 and 21 on 18th (R.A.). Chew Valley res. : seven, July 8 (B.K., M.A.W.) ; 13, Aug. 7 (J.A. McG., M.G.W.) ; eight, Sept. 25 (W.J.S.).

BAR-TAILED GODWIT *Limosa lapponica*

G. Three, New Grounds, Sept. 12 (H.J.B.) and two, Sheperdine, Sept. 29 (W.A.H.).

S. Three, Kingston Seymour, Apr. 7 (W.A.H.) ; one, Sand Bay, Apr. 28 (T.B.S.) ; two, Uphill beach, May 2 (C.E.R.) ; five, Weston Bay, Aug. 31 and four, Oct. 3 (R.A.) ; up to 20, Woodspring Bay, Sept. 3–18 and three, Oct. 16 (R.A., E.M.P., T.B.S.). Nine, mouth of R. Avon, Sept. 18 (W.A.H.). Twice reported from Chew Valley res.—single bird, Apr. 30 (W.J.H.H., W.J.S.) and two, May 7 (B.K.).

GREEN SANDPIPER *Tringa ochropus*

G. Single birds, W.T. enclosures, New Grounds, July 8 (L.P.A.); Littleton Brickworks, Aug. 7 (P.J.C.) and in low-lying pasture, Westerleigh, Dec. 17 (T.D.H.M.).

S. Chew Valley res. : two, Jan. 2 (S.G.M.) ; one, Apr. 30 (B.K.) ; up to 14, June 18–July 31 (various observers) ; at least 22, Aug. 7 (T.D.H.M.) ; up to 12, Aug. 10 to Sept. 18—thereafter single birds to Nov. 6 (various observers). Two, Blagdon res., Aug. 8 (G.G.C.) and one, Aug. 14 (R.M.C.), 17 (C.E.R.). One, Saltford Sewage Farm, Aug. 15 (R.M.C.). Two, Yeo Estuary, July 23 (R.B., C.L.) and one, same place, Sept. 11 (T.B.S.), 26 (W.A.H., J.A.F.W.). Single birds, Sand Bay area, Aug. 6 and 28 (T.B.S.).

WOOD SANDPIPER *Tringa glareola*

S. Up to seven, Chew Valley res., Aug. 6–27 (B.K., C.E.R., T.B.S. *et al.*) and single birds to Sept. 18 (R.S.H. *et al.*).

COMMON SANDPIPER *Tringa hypoleucos*

S. Single birds, presumed wintering : Blagdon res., Jan. 3 (P.J.C.), Dec. 30 (C.E.R.) ; Chew Valley res., Jan. 9 (B.S.), Nov. 27–31 (various observers) ; R. Avon, Pill, Dec. 7 (R.H.P.).

REDSHANK *Tringa totanus*

S. Breeding season records : pair, Kewstoke, Apr. 21 (T.B.S.) and Kenn Moor on 30th (P.J.C.) ; four pairs, Portbury area–nest with four eggs found, May 11 (G.B.) ; two birds, Cheddar res., Apr. 30 (B.K.) ; twelve pairs, Chew Valley res., May 21, and at same res. an ad. with half-grown youngster, July 1, and two fully grown young seen on 20th (B.K.).

SPOTTED REDSHANK *Tringa erythropus*

G. New Grounds : single birds, Mar. 13, June 24 (L.P.A.), July 6 (M.D.) ; two, Aug. 6, Sept. 15, Nov. 2 (L.P.A., M.D.).

S. Reservoirs : one, Blagdon, Jan. 2 (T.B.S.) ; one, Chew Valley, Aug. 21 (J.A.McG., M.G.W.) and two on 27th (B.K.). Single birds, Yeo Estuary area, Jan. 26 (W.S., M.W.), Sept. 18, Oct. 9, Dec. 11 (T.B.S.).

GREENSHANK *Tringa nebularia*

G. New Grounds : one, May 10 ; two on 12th and July 15–Sept. 20 (L.P.A., M.D.) ; single bird, Oct. 12 (H.J.B.).

S. Chew Valley res. : two, Apr. 9 (G.G.C.) ; one, May 21 (B.K.) and up to five, Aug. 3–28 (various observers). One, Saltford Sewage Farm, Aug. 15 (R.M.C.). Single birds, Axe Estuary area, July 20, Aug. 5 (R.A.) ; two, Aug. 13, 28 ; four, Sept. 3 (E.M.P., T.B.S.) and one, same area, Sept. 18, Oct. 9 (T.B.S.).

KNOT *Calidris canutus*

G. At least 500, Severn Beach, Sept. 28 (W.A.H.) ; 50, New Grounds, Nov. 28 (B.C.).

S. One in summer plumage, Chew Valley res., July 31 (G.B.), Aug. 4 (B.C.) ; ailing juvenile caught by hand, same place, Aug. 28 (G.B.), 1,000 or more, Yeo Estuary–Sand Bay area, Oct. 16–30 (R.A., W.A.H., T.B.S.).

PURPLE SANDPIPER *Calidris maritima*

G. Single bird, Severn Beach, Mar. 20 (B.K.).

LITTLE STINT *Calidris minuta*

Unusual numbers recorded notably on autumn passage.

G. New Grounds : up to four, May 17–June 3 and Aug. 5–30 (L.P.A.) ; 22, Oct. 1 (M.A.O.) ; 61, Oct. 2 and 30 on 3rd ; up to 17, Oct. 5–26 ; two, Nov. 2 (L.P.A.).

S. Chew Valley res. : one, Aug. 27 (B.K.) ; 13, Sept. 18

(T.D.H.M.) and up to 25 or more, Sept. 22–Oct. 4 (W.A.H., J.A.McG., M.G.W. *et al.*). Single birds, mouth of R. Avon, Sept. 18 (W.A.H.); Kingston Seymour, same date (T.D.H.M.) and Weston Bay, Oct. 7 (R.A.).

CURLEW SANDPIPER *Calidris testacea*

G. Single birds, New Grounds, Aug. 30 (L.P.A.) and Oct. 1 (M.A.O.); three, same place, Oct. 2, 5 (L.P.A.).

S. Single birds, Weston Bay–Sand Bay area, Aug. 26–Sept. 25 (R.A.); Kingston Seymour, Sept. 18 (T.D.H.M.); Chew Valley res., Sept. 18 (T.D.H.M.), Oct. 2 (J.A.McG., M.G.W.).

SANDERLING *Crocethia alba*

G. Sixty-three, New Grounds, May 24; two, same place, June 23 and fifteen, July 23–Aug. 29 (L.P.A.).

S. Up to 20, Weston Bay–Sand Bay area, Apr. 10–May 25 (T.B.S.); two, same area, July 21, Aug. 26 (R.A., R.M.C., T.B.S.).

RUFF *Philomachus pugnax*

G. New Grounds: winter records of up to eight, Jan. 1, 2 (L.P.A.). Single bird, same place, Aug. 6; 17 on 29th; up to eight, Oct. 6–Nov. 2 and single birds till Nov. 17 (L.P.A., M.D., M.A.O.).

S. Chew Valley res.: one, Mar. 27 (G.B., W.J.S.); three, including male in partial breeding plumage, Apr. 21 (W.A.H.); single bird, July 1 (B.K.); up to nine, July 13–Sept. 25 (various observers); 12 or more, Oct. 2 (J.A.McG., M.G.W.) and one on 9th (R.S.H., J.A.McG.). Two, Weston Bay, Oct. 4 (R.A.).

AVOCET *Recurvirostra avosetta*

G. Single bird on Estuary, New Grounds, May 12 (L.P.A., M.D.).

GREY PHALAROPE *Phalaropus fulicarius*

S. Chew Valley res.: one, Oct. 6 (S.G.M., E.M.W., S.G.W.); two on 9th (T.D.H.M., W.J.S.) and 15th (R.B., W.J.H.H., C.L.) and single birds, Oct. 16 (W.J.S., M.G.W.), Nov. 6 (J.A.McG.).

GREAT SKUA *Catharacta skua*

S. One off Middle Hope (Sand Point), Sept. 11: seen by R. A. who records that it was "harrying Black-headed Gulls twice in half an hour offshore, then sitting on water. Large size, heavy build, broad wings, dark brown plumage with light patches at base of primaries".

ARCTIC SKUA *Stercorarius parasiticus*

G. A skua seen in distance on the Estuary, Aust, Aug. 31 was almost certainly this species (B.C.).

S. One, a light phase bird, on coast, Kingston Seymour, Sept. 11 ; when first noted it was attacking Black-headed Gulls, compared with which it was rather larger, and when last seen (distant view) was in company with what appeared to be a second Arctic Skua (C.E.R.).

GREAT BLACK-BACKED GULL *Larus marinus*

S. Inland records : two or three frequently seen, Cheddar and Chew Valley resrs., notably in periods Jan.–Mar. and Nov.–Dec. (B.K., J.A.McG.).

LESSER BLACK-BACKED GULL *Larus fuscus graellsii*

G. and **S.** Cotswold records of *c.*20 in field, Tormarton, Aug. 30 and more than 40 on ploughed land, same area, Oct. 10 (J.D.R.V.). Roosting in large numbers again reported from Chew Valley res.–400, with many Herring Gulls, Oct. 23, Nov. 5, and at least 150 as late as Dec. 10 (B.K.).

Results of B.T.O. enquiry into winter distribution, Dec. 1, 1959—Feb. 14, 1960, showed a population in the area of *c.*150 ad. or fourth-year birds, compared with total of less than 20 found during survey of 1949–1950. Roosting noted at Chew Valley res. (60), mouth of Avon (50) and Steep Holm (less than 25), with largest diurnal numbers along the Avon to Bath (Res. Stn.).

SCANDINAVIAN LESSER BLACK-BACKED GULL *Larus fuscus fuscus*

G. and **S.** Single bird over the W.T. enclosures, Slimbridge, Feb. 6 (B.K.), was considered to be an example of this form.

HERRING GULL *Larus argentatus*

G. Pair nested, Aust Cliff, 1959 ; ad. seen incubating, June 27 (P.J.C.).

COMMON GULL *Larus canus*

S. Noteworthy counts of *c.*650 on mud, Weston Bay, Dec. 22 (R.A.) and over 420, Blagdon res., on 30th (G.S.).

LITTLE GULL *Larus minutus*

S. Immature bird, Cheddar res., Apr. 30 (B.K.). One, imm., Chew Valley res., Sept. 23 (R.S.H.) and one, ad., Oct. 23 (B.K.).

KITTIWAKE *Rissa tridactyla*

S. Injured first-summer bird on beach, Sand Bay, June 12 (T.B.S.) ; three, an ad. and two first-winter birds, dead in tide-wrack, same place, Dec. 4 (P.J.C., M.A.W.).

BLACK TERN *Chlidonias niger*

G. Five on the Estuary, New Grounds, May 12 (L.P.A.) ; at least 130, same place, Aug. 27 (L.P.A.) and two, Sept. 27 (M.D.).

S. Coastal records of single birds, Weston Bay, Aug. 31, Sept. 2 (R.A.) ; Woodspring Bay, Sept. 3 (E.M.P.) and R. Axe on 21st (R.A.). Very few on spring passage at resrs. : 17, Chew Valley, May 12 (R.S.H.) and nine on 13th (B.K.). Seen in most weeks, Chew Valley, early Aug. to mid-Oct., with max. totals of 22, Aug. 28 (B.K.), Sept. 4 (W.J.S.) and 28, Sept. 13 (S.H.G.B., A.C.L.). Three, Cheddar, Sept. 1 ; two on 18th and one, Oct. 16 (J.A.McG., M.G.W.). Ten or twelve, Blagdon, Sept. 17, 18 (R.B., G.G.C., C.L.) and two, Barrow Gurney, Oct. 9 (P.J.C.).

WHITE-WINGED BLACK TERN *Chlidonias leucopterus*

G. One on the Estuary, New Grounds, with large number of Black Terns, Aug. 27 ; seen and identified by L.P.A. who, in a detailed description, reports that the bird "appeared to be moulting as although it had the broad white area of the forewing on the upper surface, together with blackish primaries and trailing edge, the black of the head and body showed traces of white, most noticeable on the head. Apart from the white forewing the ventral region and tail (both surfaces) as well as the rump were conspicuously white". First record for Gloucestershire.

COMMON TERN *Sterna hirundo* ARCTIC TERN *Sterna macrura*

G. New Grounds : sixteen on the Estuary, May 12 (M.D.) and three, July 5 (L.P.A.). One overhead inland near Wick, July 28, after night of S.W. gales (D.R.H.). Party of four moving south, Shirehampton, Aug. 28 (R.H.P.).

S. Five flying up-river between Weston-super-Mare and Steep Holm, May 13 (Res. Stn.). Up to three, Chew Valley res., various dates, late Apr. to mid-July (R.S.H., M.A.W. *et al.*) and frequently noted, same reservoir, Aug. to late Oct. with max.

numbers of 14, Aug. 27 (B.K.); 12, Sept. 4 (P.J.C., J.D.R.V.) and 18th (R.M.C., T.D.H.M.). Five, Blagdon res., Sept. 18 (R.S.H.). Up to half a dozen, Cheddar res. on several dates, July–Sept. (B.K., J.A.McG., M.G.W.) but 20 reported by Jnr. Sect., Sept. 1. One, same reservoir, as late as Nov. 5 (G.G.C., G.S.).

LITTLE TERN *Sterna albifrons*

G. Single birds on the Estuary, New Grounds, June 9, 10 (L.P.A., M.D.) and Aug. 20, 25 (M.D.).

S. Four, Chew Valley res., May 12 and two on 22nd (R.S.H.).

SANDWICH TERN *Sterna sandvicensis*

G. One on the Estuary, New Grounds, July 3 (L.P.A.).

S. One, perhaps a wintering bird, in flight, Chew Valley res., on exceptional date of Mar. 12; seen by B.K., who reports that good views were obtained and that the dark bill and generally large size precluded it from being one of the smaller tern species (For a winter record of one at Cheddar res. in 1945 cf. *Brit. Birds*, XXXIX, p.93).

LITTLE AUK *Alle alle*

S. Dead bird, without head but otherwise in good condition, found near water's edge, Blagdon res., Nov. 6 by R.B. and C.L., who have forwarded full details.

STOCK DOVE *Columba oenas*

S. Two, Steep Holm, Oct. 5; first record for the island (Res. Stn.).

BARN OWL *Tyto alba*

G. One nr. Thornbury, Feb. 7 (J.D.R.V.) is the only record received.

S. Reported at frequent intervals and from widely separated areas (various observers).

SHORT-EARED OWL *Asio flammeus*

S. One in flight, Kingston Seymour, Mar. 31 (J.G., W.A.H., J.A.F.W.). One disturbed from plateau, Steep Holm, Oct. 4, flew out to sea; first record for the island (Res. Stn.). One put up on south slope, Sand Point, Oct. 16 (R.A.) and this, or another, was seen in flight over *Spartina* beds, Sand Bay, Dec. 21 (T.B.S.).

ALPINE SWIFT *Apus melba*

S. One watched by W.A.H. hawking insects, Redcliffe Bay, Portishead, Oct. 2 ; diagnostic features included large size, pale brown upperparts, white belly and broadly forked tail. Record accepted by *British Birds* Rare Birds Committee. Second recorded occurrence for the Bristol area—the first being in 1851 or earlier (cf. *Proc. Bristol Nat. Soc.*, 1947, 241).

SWIFT *Apus apus*

G. One, Sheperdine, as late as Oct. 2 (J.D.R.V.).

S. Enormous numbers—not less than 2,000, Chew Valley res., May 15 (P.J.C., B.K., M.A.W.).

HOOPOE *Upupa epops*

S. One in flight, Compton Dando, June 6 (P.H.).

LESSER SPOTTED WOODPECKER *Dendrocopus minor*

G. One calling from apple tree, Sea Mills, Aug. 1. (H.W.N.).

S. Pair, Leigh Woods, Apr. 20 (B.C.). One, Chewton Keynsham, Apr. 24 and pair with young in alder stump, Bishop Sutton, June 2 (G.B.). Noted outside breeding season at Blagdon (W.A.H.), Chew Valley res. (R.A.), Compton Bishop (J.F.B.) and Great Elm, nr. Frome (E.D.O.).

WRYNECK *Jynx torquilla*

S. Single bird moving and calling over wide area of Leigh Woods, Apr. 20 (B.C.) and one, first seen climbing a vertical iron pipe, Long Ashton, Aug. 2 (G.E.C.).

WOODLARK *Lullula arborea*

S. Noted in breeding season at Holcombe, nr. Downside (R.S.H.), Blagdon (R.M.C.), Brockley Combe (G.E.C.), Cheddar (R.A.) and Wavering Down (W.L.R., T.B.S.). Juvenile caught and ringed, Steep Holm, Oct. 4 (Res. Stn.). One in flight, Weston-s-Mare, Oct. 16 (R.A.).

SHORELARK *Eremophila alpestris*

G. Male, on foreshore, Severn Beach, Jan. 31–Mar. 4 ; first located by H.D. and subsequently seen by many observers.

SWALLOW *Hirundo rustica*

S. Small easterly passage, most days, Steep Holm, Oct. 1–10 ; heaviest movement on 4th, when at least 1,000 seen during first few hours of daylight and 92 caught in mist nets (Res. Stn.).

RAVEN *Corvus corax*

S. One or two, frequently noted, Weston-super-Mare area; two ads. and three juvs., Brean Down, May 21 (E.D.O.). No evidence of breeding, Steep Holm; two on island, several days, early Oct. (Res. Stn.).

CARRION CROW *Corvus corone*

S. Pair bred in elder, Steep Holm—two young being ringed, May 15; two or three on the island, several days, early Oct., appeared to return to Brean Down area in late afternoon (Res. Stn.).

LONG-TAILED TIT *Aegithalos caudatus*

S. Marked increase in records from several areas suggest unusual autumn numbers. Party of six leaving Brean Down in westerly direction, and another four on headland, Oct. 16 (P.J.C., M.A.W.); four in garden (first record), Kewstoke, Weston-s-Mare, Oct. 22 (T.B.S.).

DIPPER *Cinclus cinclus*

S. Only one record—single bird on stream, Holcombe, nr. Downside, May 10 (R.S.H.).

REDWING *Turdus musicus*

S. At least 1,000 flying S.S.W., Sand Point, in driving snow, late afternoon, Jan. 13 and many present, Weston Woods at dusk (R.K.N.). Large autumn roost in conifers and young beeches, Rowberrow Warren, Shipham, with peak count of approx. 13,000, Dec. 10 (T.B.S.).

RING OUZEL *Turdus torquatus*

S. One, Sand Point, Mar. 20 (R.B., C.L.); male and female, Brean Down, Mar. 26 (R.H.R.); single bird, Sand Bay, Mar. 27 (L.P.T.) and a male, Wavering Down, Apr. 9 (W.L.R., T.B.S.). Late summer record of male, Brean Down, Sept. 18 (B.S.).

WHEATEAR *Oenanthe oenanthe*

G. Single bird, Severn Beach, Mar. 11 (T.B.S.).

S. Early arrival—male, Sand Point, Feb. 29 (W.L.R.); next recorded, Portishead and Brean Down, Mar. 13 (C.M., W.A.H.), and Woodspring, same date (T.B.S.). Nest with two young, nr. Charterhouse, June 6 (P.J.C., M.A.W.). Two, possibly three, Steep Holm, Oct. 7 (Res. Stn.).

STONECHAT *Saxicola torquata*

G. Single birds, Avonmouth, Feb. 7 and Moorend, nr. Winterbourne, Nov. 5 (R.H.P.) ; male and female, nr. Westerleigh, Nov. 27 (J.D.R.V.).

S. Pair feeding four young in nest, Brean Down, Apr. 23 (R.A.). Reported from fourteen different localities with max. counts of six, Sand Point, Feb. 17 (R.K.N.) ; eight, Brean Down, Oct. 16 (P.J.C., M.A.W.) and six, Chew Valley res., Dec. 4 (B.K.). Male and female, Steep Holm, Oct. 7 (Res. Stn.).

WHINCHAT *Saxicola rubetra*

G. One, Sheperdine, Aug. 21 (J.D.R.V.).

S. Seen on spring passage nr. Sand Point, Apr. 24 (T.B.S.) ; Uphill, Apr. 27 (R.A.) and Stoke Villice, May 5 (R.S.H.). Breeding season records from Chew Valley res. and several Mendip localities.

BLACK REDSTART *Phoenicurus ochruros*

S. Female or imm., Brean Down, several dates Feb. (H.W.N. *et al.*) ; ad. male and female or imm., same place, late Oct. to end of year (many observers). Single female on seawall, Kingston Seymour, Mar. 31 (J.G., W.A.H., J.A.F.W.) and male, Long Ashton, Oct. 25 (M.A.W.).

GRASSHOPPER WARBLER *Locustella naevia*

G. One, Wick, Apr. 26 (D.R.H.) ; five singing males, Damery, May 1 (T.D.H.M.) and one ‘ reeling ’, Hawkesbury Common, July 3 (R.H.P.).

S. First noted, Blagdon res., Apr. 17 (P.J.C.). Subsequent records of singing birds from Chew Valley res., (G.B., G.S.), Leigh Woods (R.M.C.), Sand Point (T.B.S.), Walton Moor (P.J.C.), and Weston Woods and Worlebury (R.A.).

SAVI'S WARBLER *Locustella luscinioides*

S. One in marshy growth, Chew Valley res., late July ; first seen, on 24th, by B.K., who in a detailed description refers to the uniformly drab brown upper parts, the noticeably graduated tail, and the reeling song—lower in pitch and mostly of shorter duration than in Grasshopper Warbler; seen also, down to 15 yds. range, on 30th (B.K., K.B.Y.). Identification confirmed by *Brit. Birds* Rare Birds Committee. No previous record for Somerset.

BLACKCAP *Sylvia atricapilla*

G. Male, previously seen end Dec., 1959, in W.T. enclosures, New Grounds, still present, Jan. 3 (E.M.N.). Male, feeding on fat hanging nr. window, Clifton, Jan. 30, Feb. 25, 26 (P.J.C.). Another record of male in suburban garden, also feeding on fat, Westbury-on-Trym, several dates, Feb. 7–20; and female in same garden on 12th (J.F.R.). Single male, St. George, Bristol, Feb. 21 (G.B.).

DARTFORD WARBLER *Sylvia undata*

S. Single bird—almost certainly an ad. male—first seen and identified by W.A.H. in coastal strip of bracken and gorse, nr. Walton-in-Gordano, Oct. 16. Later in day seen several times at varying ranges by same observer and H.H.D. who have both supplied a full description and behaviour notes. First authentic record for Somerset.

CHIFFCHAFF *Phylloscopus collybita*

G. and **S.** Several records of wintering birds: one in garden, St. George, Bristol, Feb. 14 (G.B.); singing bird, Stanton Drew, Feb. 21 (W.J.S.); two in reed bed, Chew Valley res., Dec. 17 (R.B., B.K.) and one, either this or *Ph. trochilus*, same res., Dec. 18 (P.J.C., M.A.W.).

FIRECREST *Regulus ignicapillus*

S. Adult male caught in mist net, Steep Holm, Oct. 4 (Res. Stn.).

PIED FLYCATCHER *Muscicapa hypoleuca*

G. Single birds, Winterbourne, May 5 (L.G.S.) and Wick, Aug. 6 (D.R.H.).

S. Female, trapped and ringed, Steep Holm, Oct. 10 (Res. Stn.).

RICHARD'S PIPIT *Anthus richardi*

S. One flushed from long grass, Brean Down, Oct. 16 (E.G.H.); record accepted by *Brit. Birds* Rare Birds Committee.

TREE PIPIT *Anthus trivialis*

S. Breeding reported from Ashton Park (S.K.T.), Charterhouse (T.B.S.) and Chew Valley (W.J.S.); also reported in breeding season from Cheddar, Priddy and Shipham (T.B.S.).

ROCK PIPIT *Anthus spinoletta petrosus*

S. Reservoir records of single birds, presumably this race: Chew Valley, Feb. 28 (R.M.C.) and Mar. 12 (B.K.); Cheddar, Oct. 16 (J.A.McG.), Dec. 11 (R.M.C.) and 29th (M.G.W.).

Water Pipit *Anthus spinoletta spinoletta*

G. Single bird in summer plumage, New Passage, Apr. 1 (W.A.H.).

S. Identified, Chew Valley res., all months Jan.–Apr. and Oct.–Dec. with highest counts of eight, Mar. 13 (P.J.C., M.A.W.) and nine, Mar. 20 (W.J.S.), Apr. 3 (R.M.C.) ; smaller autumn numbers with one, occasionally two, reported from Oct. 30 (R.M.C., R.S.H., M.J.W. *et al.*). One, Cheddar res., Mar. 27 (P.J.C., M.A.W.) and Nov. 23 (W.L.R.).

White Wagtail *Motacilla alba alba*

G. Seven, New Grounds, Apr. 16 (B.K.).

S. First spring record—two, Cheddar res., Apr. 3 (M.G.W.) ; up to four reported to second week of May, Chew Valley res., Clevedon, Sand Bay and Weston-super-Mare (various observers).

Blue-headed Wagtail *Motacilla flava flava*

S. Single males of this race seen in company with *flavissima* wagtails, Cheddar res., May 1 (M.G.W.) and Chew Valley res., same date (B.S.).

Red-backed Shrike *Lanius collurio*

S. Male, Kewstoke, same site as in prevous year, May 13 to June 18, but no evidence of breeding (R.A., T.B.S.). A male, sea wall hedgerow, nr. Kingston Seymour, June 5 (H.H.D.).

Starling *Sturnus vulgaris*

G. Recoveries of birds ringed in Bristol :—

Ringed (as full-grown)	*Recovered*
V 13383, Eastville, 12/2/60 :	85m. N.N.E. nr. Cannock, Staffs, 15/3/60 (M.J.B.)
V 31866, Downend, 13/12/59 :	Nr. Eutin, Schleswig Holstein, Germany, 26/5/60 (R.H.P.)
X 33477, Clifton, 16/1/60 :	Diehsa, nr. Dresden, Germany, 3/8/60 (P.J.C.)

Hawfinch *Coccothraustes coccothraustes*

G. Single birds, Durdham Down, Jan. 7 (S.K.T.) ; Stoke Bishop, Feb. 15, 20 (I.H.S.) and Mar. 18 (C.M.).

Greenfinch *Chloris chloris*

G. and **S.** Increase in usual winter population, Jan.–Mar., reported from Downend (50 caught in small garden), Eastville, Horfield, Stoke Bishop and New Grounds (M.J.B., H.J.B., R.H.P. *et al.*). Flocks totalling at least 1,000, Chew Valley res., Jan. 31 (T.D.H.M.).

SISKIN *Carduelis spinus*

G. Twenty-four, reported previous Dec., Bitton, still present Jan. 2 (G.B.); two on river-bank, Avonmouth, Feb. 7 (R.H.P.) and up to 8, Feeder Canal, Bristol for most of month (B.K.B.). Two, New Grounds, Nov. 8 (L.P.A.).

S. Singles or small parties noted, winter months, at Blagdon (P.J.C.), Cheddar (J.A.McG.), Kenn Moor (W.J.S.), Saltford (P.H., P. Stiling) and Weston Woods (R.K.N.). Probable passage migrants—five, Sand Bay, Oct. 13 (W.L.R.); one flying north, Sand Point, Oct. 23 and party of seven, moving west, same place on 30th (R.A.).

LESSER REDPOLL *Carduelis flammea cabaret*

G. Twelve, Filton golf course, Mar. 22 and three on 24th (T.D.H.M.). One in W.T. enclosures, New Grounds, in Apr.; two, May 1 and one, Oct. 24 (L.P.A.).

S. Two in birch copse, Burrington, Nov. 5 (T.B.S.).

CORN BUNTING *Emberiza calandra*

S. Winter record of three on shore, Sand Bay, Jan. 10 (R.A., T.B.S.). Singing birds in breeding season, Charterhouse (T.B.S.), Saltford (B.K.) and Yoxter, Mendip (P.J.C.).

CIRL BUNTING *Emberiza cirlus*

G. Single bird, Draycott, May 19 (J.D.R.V.) and Horse Shoe Bend, Shirehampton, June 1 (H.W.N.).

S. Reported from many localities at all seasons; two pairs bred in garden, Wraxall (W.G.).

SNOW BUNTING *Plectrophenax nivalis*

G. Single bird, New Grounds, Jan. 8 (L.P.A.).

S. Two, Cheddar, Jan. 16 (T.D.H.M.). Coastal records—eleven, Sand Bay, Jan. 9 (T.B.S.) and at least seventeen on 17th (R.A.); sixteen, Woodspring Bay, same date, and one, Sand Point, Mar. 31 (T.B.S.). Autumn return to Sand Bay, Nov.–Dec., with max. count of fourteen, Nov. 20 (R.A., R.B., C.L., T.B.S.). Three, Brean Down, Nov. 10 (J.A.McG.); party of seven, Kingston Seymour, on 13th (D.J.H., T.D.H.M.).

HOUSE SPARROW *Passer domesticus*

S. Seven females or imms., moving over plateau, Steep Holm, Oct. 6 (Res. Stn.) and four, flying west, Sand Point, Oct. 30 (R.A.).

LEPIDOPTERA NOTES
BRISTOL DISTRICT, 1960

By C. S. H. Blathwayt

AFTER average weather during the first few months of the year some fine and warm conditions were experienced during May and June. From the beginning of July onwards the weather was generally wet and very poor and the year was a bad one for both Butterflies and Moths.

The following notes are taken from records supplied by R. Angles (R.A.), K. H. Poole (K.H.P.) and A. H. Weeks (A.H.W.), and also my own records (no initials).

Colias croceus Fourc. (*edusa* Fabr.) (Common Clouded-yellow). One on 12 July, three in mid-Sept., Wrington (A.H.W.); one at Uphill, Aug. 25 (R.A.); one at Flax Bourton, Aug. 3.

Argynnis cydippe Linn. (*adippe* Linn.) (High Brown Fritillary). A few seen behind Brockley and Goblin Combes, 19 June to 12 July (A.H.W.).

Vanessa cardui Linn. (Painted Lady). One specimen in late March, Avon Gorge, and another at Yatton, 25 June (A.H.W.); one at Brean Down, 30 July (R.A.).

Vanessa atalanta Linn. (Red Admiral). A considerable movement of specimens (35 counted) eastward in Brean Down area, Sept. 26 (R.A.).

Thecla betulae Linn. (Brown Hairstreak). 18 larvae beaten from Sloe near Glastonbury, June 6, produced 18 butterflies between July 10 and Aug. 15.

Arctia villica Linn. (Cream-spot Tiger). Several at light, Weston, end of May to early June.

Comacla senex Hubn. (Round-winged Footman). One at Shapwick, June 3, and another at Weston, July 2, both at light.

Cybosia mesomella Linn. (Four-dotted Footman). Common at light at Shapwick, June 3.

Agrotis cinerea Hubn. (Light Feathered Rustic). One at light at Milton, May 31 (K.H.P.).

Hadena suasa Schiff. (*dissimilis* Knoch) (Dog's-tooth). One at light at Shapwick, July 29.

Hadena conspersa Esp. (*nana* Rott.) (Common Marbled Coronet). One at light at Weston, May 9.

Apamea sublustris Esp. (Reddish Light Arches). One at light at Milton, June 26 (K.H.P.).

Dasypolia templi Thunb. (Brindled Ochre). One at light at Weston, Oct. 15.

Arenostola fluxa Hubn. (*hellmanni* Ev.) (Mere Wainscot). One at light at Weston, June 23.

Leucania putrescens Hubn. (Devon Wainscot). One at light at Weston, July 24.

Leucania unipuncta Haw. (White-speck Wainscot). One at light at Weston Sept. 12.

Caradrina ambigua Fabr. (Vine's Wainscot). One at light at Weston, Aug. 24.

Zenobia retusa Linn. (Double Kidney). Several at light at Shapwick, July 29.

Orthosia advena Schiff. (*opima* Hubn.) (Northern Drab). One at light at Weston, April 25.

Tiliacea citrago Linn. (Orange Sallow). One at light at Milton, Sept. 1 (K.H.P.).

Cirrhia gilvago Esp. (Dusky-lemon Sallow). One at light at Weston, Sept. 27.

Tholomiges turfosalis Wocke (Marsh Oblique-barred). A few at light at Shapwick, July 29.

Comibaena pustulata Hufn. (Blotched Emerald). One at light at Weston, June 21.

Sterrha trigeminata Haw. (Treble-spot Wave). A few at light at Weston in June.

Colostygia salicata Hubn. (Striped Twin-spot Carpet). One at light at Weston, Aug. 26.

Larentia clavaria Haw. (*cervinata* auct.) (Mallow carpet). One at light at Milton, Sept. 29 (K.H.P.).

Nyctosia obstipata Fabr. (*fluviata* Hubn.) (Narrow-barred Carpet). A few at light at Weston in early July.

Eupithecia inturbata Hubn. (Maple Pug). One at light at Weston, Aug. 7.

Cossus cossus Linn. (*ligniperda* Fabr.) (Goat). One at light at Weston, June 15.

Eucosma foenella Linn. (White-foot Bell). One at Weston, July 3 (K.H.P.).

BASAL GRAVEL IN THE ALLUVIUM NEAR SEVERN BEACH

By C. E. Leese and W. F. Vernon

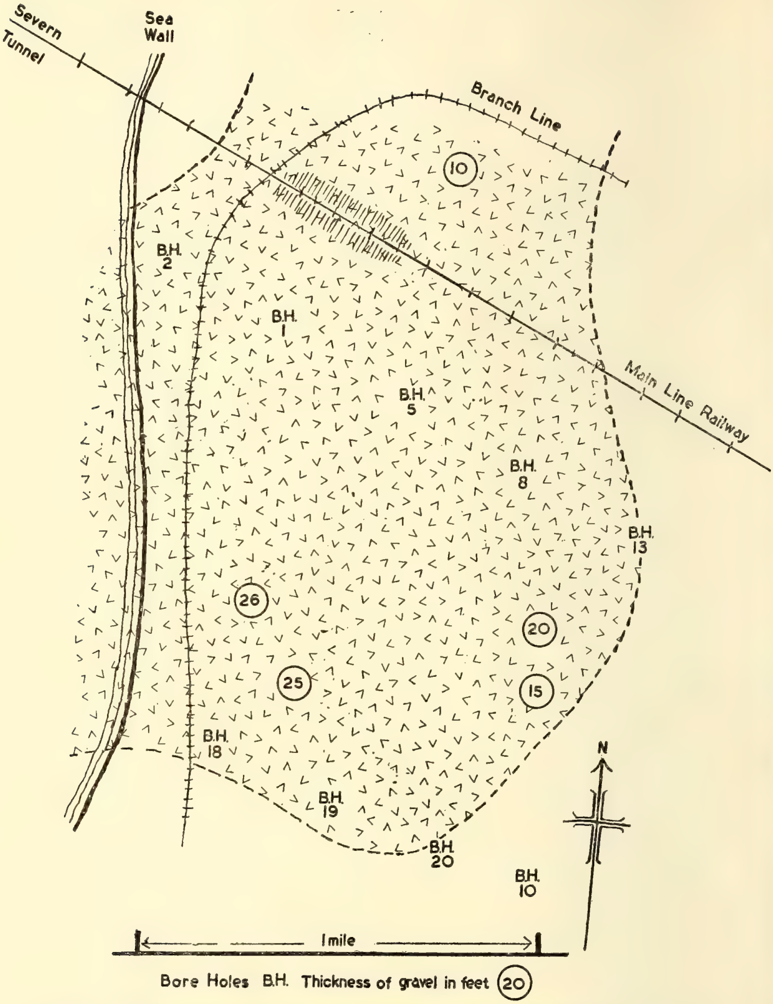
EXPLORATORY borings on the Severnside site being prepared for the new works for Imperial Chemical Industries have shown that between the top of the estuarine alluvium of the district and the underlying Keuper Marl there is a roughly lenticular bed of gravel with a maximum thickness of a little over 30 ft. Its proved extent is more than a mile in the west-east direction and about a mile and a half southwards from the railway approach to the Severn Tunnel. It probably continues north of the railway and under the Severn. Fig. 1 shows the location of bore holes and the extent of the gravel. The National Grid reference of the centre of the gravel bed site is ST 544/850 ; Ordnance Survey maps, 6 in. to 1 mile, for this area are Gloucester sheets 58 S.E. and 58 S.W.

The gravel bed is of economic importance since, where it is thick enough, it provides the stable foundations needed to support substantial buildings in a region where the top strata are mostly silty clay and peat. Geologically it is of interest in adding to our knowledge of the Severn gravels, of the history of the river and of the Bristol Channel. The geological problems are to relate the new information to what is already known and if possible to discover the provenance of the gravels.

Detailed information from 24 bore holes spaced out for over 1½ miles inland from the sea wall and a similar distance along the river has been made available to us by I.C.I. whom we thank and also their Site Engineer, Mr. R. J. Philo, for his helpful co-operation. Details are shown in Figs. 2 and 3 of sections based on borings spaced along two lines running approximately west-east. Records of deep borings in this area and further south are available and also of the strata exposed during the construction of the Severn Tunnel and its approaches. An important contribution to the subject was made by G. F. Mitchell (1960) in his Presidential Address to the Geology Section of the British Association at Cardiff, in which he made special reference to the area considered here. Wills (1938) provided an immense amount of information about the terraces.

The natural land surface of the neighbourhood is nearly level

Fig. I


Severn Tunnel
Sea Wall
Branch Line
Main Line Railway
10
B.H. 2
B.H. 1
B.H. 5
B.H. 8
B.H. 13
26
20
25
15
B.H. 18
B.H. 19
B.H. 20
B.H. 10
N
1 mile
Bore Holes B.H. Thickness of gravel in feet (20)

Sketch map showing the extent and thickness of a gravel bank at base of alluvium near Severn Beach, Gloucestershire.

Information supplied by Imperial Chemical Industries Ltd.

Fig. 2

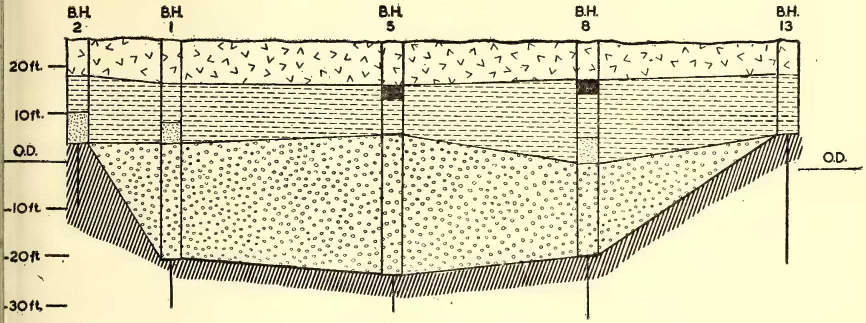
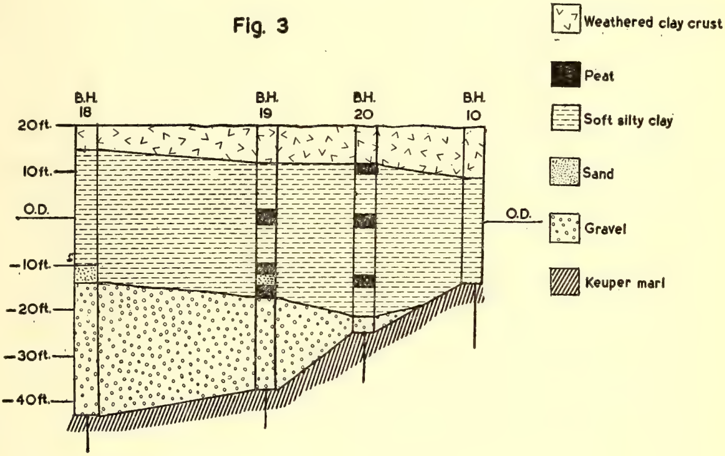

B.H. 2
B.H. 1
B.H. 5
B.H. 8
B.H. 13
20ft.
10ft.
O.D.
-10ft.
-20ft.
-30ft.
O.D.

Fig. 3


B.H. 18
B.H. 19
B.H. 20
B.H. 10
20ft.
10ft.
O.D.
-10ft.
-20ft.
-30ft.
-40ft.
O.D.
Weathered clay crust
Peat
Soft silty clay
Sand
Gravel
Keuper marl

Figs. 2 and 3. Profiles of the Severnside gravel bed (constructed from information supplied by I.C.I.). The position of the bore holes is shown in Fig. 1.

at +20 ft. O.D. Below the top soil is a layer of weathered clay and below this an irregular deposit of soft, wet, silty clay and sand with occasional beds of peat at various depths. In the north of the area where it is underlain by the gravel, the alluvium is less than 10 ft. deep but towards the south where the gravel is absent it is 50 ft. thick and rests directly on the Keuper Marl.

There are striking irregularities in the top surfaces of both the gravel and the Keuper Marl, which range from 2 ft. above O.D. to 42 ft. below, with humps and hollows irregularly disposed. The continuous levels usually associated with river terraces are noticeably absent. A possible explanation of this may be derived from Mitchell's paper. Each of the main Ice Ages must have been accompanied by a lowering of the general sea level, through the locking up of great quantities of water in the ice caps. Erosion by rivers must have been increased enormously by their steepened gradients and the rush of summer meltwater. This may account for the existing steep-sided gulley on the Chepstow side of the estuary known as "The Shoots". It is ¼ mile wide and 50 to 60 ft. deep and takes almost the whole flow during the lower half of the tide cycle, the water running at speeds of up to twelve knots. Erosion may have washed away superficial deposits and tributary streams, large and small, carved the Keuper Marl into its present form.

When the Irish Sea Ice reached its most southerly extension spreading from N. Devon to Southern Ireland it must have blocked the outlet of the Severn forming a large sheet of water to which Mitchell has given the name of "Lake Maw" (*cf.* Maw, 1864). It is suggested that the gravel bed described here is part of the delta laid down by the Wye discharging into this lake though some contribution to the detritus by the Severn is not ruled out.

The gravel is poorly sorted, ranging from coarse sand to well-rounded pebbles 3 inches in diameter. Dolerites, basalts, volcanic agglomerates, clear-, milky- and vein-quartz are the commonest constituents and there is some fragmentary unworn chert. There are large pebbles of Old Red Sandstone grits (Tintern Sandstone), red limestone, Carboniferous Limestone, indurated shales and slates, felsites, and porphyritic basic igneous rocks, all of which may have been transported by the Wye from Central Wales. It is significant that the gravel bank lies directly opposite the mouth of that river. On the other hand there are a few small pebbles of oolitic limestone with shell fragments, which are probably Jurassic and may have been brought by the Severn.

The peat layers disclosed by the boring are of interest for the variety of levels at which they were found. Of 19 samples :

2 were at between —20 and —30 ft. O.D.
7 " " " —3 " —12 " "
5 " " " 0 " +10 " "
5 " " " +10 " +15 " "

Richardson's diagram (1887) of the railway cutting section shows a band of peat following a wavy line over a considerable distance ; it is at about O.D. level and is cut through by four gullies filled with mud indicating old water courses.

Clearly there is much in this area calling for further investigation and Mitchell's challenge to Bristol and Cardiff geologists to trace the margins of Lake Maw is commended. Thanks to the careful preservation of data by I.C.I., Severn Beach would make an excellent point of departure for such an enquiry.

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CHROMOSOME NUMBERS IN *CALAMAGROSTIS EPIGEJOS* (L.) ROTH FROM SOUTHERN BRITAIN

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(Genetics Laboratory, Department of Botany, University of Bristol)

INTRODUCTION

The Wood Small-reed, *Calamagrostis epigejos*, a coarse grass of wide distribution in Britain in wooded areas, hedgerows and fens, is known to occur in Europe in several forms which are morphologically similar but differ in chromosome number (cytotypes). Clapham, Tutin and Warburg (1952) reported the chromosome numbers, all based on non-British material, as $2n=28$, 56; 35, 42, 49; *c.* 70. Avdulov (1931) counted a specimen, with $2n=70$, but the origin of the material is uncertain. Nygren (1946) found plants in Sweden with $2n=28$, 42 and 56 and in breeding experiments obtained plants with a wide range of chromosome numbers. Westergaard (1943) reported that plants with $2n=28$ and 56 were widespread in Denmark and that these showed detectable differences in stomatal length and pollen diameter. He referred to plants with $2n=28$ as diploids and with $2n=56$ as tetraploids and this system will be followed here. The purpose of the present work was to determine whether plants in southern Britain were of more than one cytotype.

MATERIALS AND METHODS

Plants were collected from a number of localities in S.W. Britain and grown in the Experimental Greenhouses, Bristol University. Root tips and young inflorescences were fixed in the field wherever possible and in addition meiotic and pollen grain material was supplied by Miss K. Luck.

In squash preparations of root tips and pollen-mother-cells both Feulgen and acetocarmine stains gave good results. Stomatal length was measured on epidermal strips from leaves cleared in gum chloral from living and herbarium material. Pollen diameter was measured on material fixed in 1 : 3 acetic/alcohol, "good" pollen being determined by size and shape and the reaction of the nuclei and cytoplasm to acetocarmine stain.

RESULTS

1. Chromosome counts

(*a*) *Root-tip counts.* It was found difficult to separate the cells of root-tips even after digestion in acid alcohol. Furthermore, pretreatment by means of a cold-shock, 0.01% colchicine solution or α-bromo-naphthalene was not entirely successful in dispersing the chromosomes which tended to cluster strongly on the metaphase plate. In view of these difficulties the counts based on root-tip mitoses are approximate only and are given in Table 1.

TABLE 1. Chromosome counts on mitosis in root-tip squashes.

Locality	Late Prophase	Metaphase
Loxton, Somerset ..	?25, ?27, ?28	?25, ?27, ?28
Weston-s-Mare, Som. ..	—	?24
Cheddar Wood, Som. ..	?25, ?29	—

In one cell two bridges were visible at anaphase (Plate 1, No. 3).

(*b*) *Pollen-Mother-Cell counts.* Diplotene, diakinesis and metaphase I gave clear, countable results and over 100 cells were analysed in material from Braunton Burrows, Devon. All showed 14 bivalents but over 10% of these cells showed connections between two bivalents (Plate I, No. 6). Usually only two bivalents in a cell, but in one case three bivalents and in another two separate pairs of bivalents, showed such connections. Analysis of interstitial and terminalised chiasmata in 21 cells at diplotene-diakinesis revealed the average number of chiasmata per bivalent to vary between cells from 1.3 to 1.8, the majority having the value 1.4 to 1.6. In several cells at diakinesis stained with acetocarmine the nucleolus was clearly visible with projections to two bivalents (Plate I, No. 4). All counts recorded in Table 2 showed n=14 except one cell with possibly 13 bivalents in material from Pwll-du-Bay. However at the second pollen mitosis 14 chromosomes were observed here too (Plate I, Nos. 1 and 2). Connections between two bivalents were also observed in material from Pwll-du-Bay and Marloes.

TABLE 2. Chromosome counts on meiosis in pollen-mother-cell squashes.

Locality	Number of bivalents	
	Diplotene–Diakinesis	Metaphase I
*Marloes, Pembrokeshire	14	14
*Pwll-du-Bay, Glamorgan	?13	—
*Aldbourne, Sussex	14	—
*Wicken Fen, Cambridgeshire . .	14	—
Braunton Burrows, Devon	14	14

* Material supplied by Miss K. Luck.

2. Pollen Diameter

Westergaard (1943) reported that this was the most reliable character for separating the cytotypes. He gave for four diploid plants a range of pollen diameter of 20–35μ (mode 26–28μ) and for four tetraploid plants 26–43μ (mode 31–36μ). Our results are given in Table 3 from which it may be concluded that the plants listed are probably diploid.

3. Stomatal Length

Stomatal length gave inconclusive results owing to wide variation in length on any one leaf and between leaves on a single plant as well as between plants. Westergaard (1943) reached similar conclusions, although he found that stomatal length tended to be larger in tetraploid than in diploid plants.

DISCUSSION

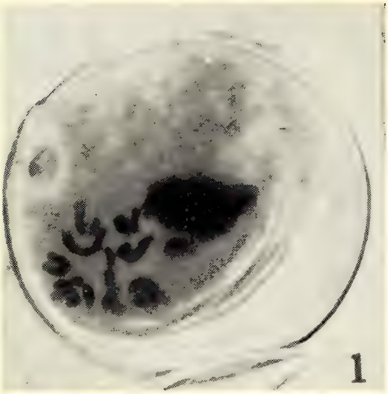
The results above indicate that in 12 scattered localities in southern Britain plants of *Calamagrostis epigejos* are probably diploid with 2n=28. The mitotic anaphase bridges and the connections between bivalents at meiosis might signify a type of " sticky-chromosome " condition (Beadle, 1932). However, these phenomena, taken in conjunction with the association of the nucleolus with two bivalents in meiosis, may indicate that plants with

Table 3. Diameter of pollen grains in μ (100 counts per plant) and % of "good" pollen.†

Locality	Range	Mode	Chromosome Number	% "good" pollen
*Aldbourne, Sussex	22–31	24–26	2n=28	98
*Wicken Fen, Cambridgeshire ..	20–37	23–25	2n=28	90
*Marloes, Pembrokeshire	20–29	23–25	2n=28	93
*Pwll-du-Bay, Glamorgan	18–36	24–26	2n=28	94
*Holton Cliff, Glamorgan	22–29	24–26	?	93
*Mumbles, Glamorgan	18–27	20–22	?	94
*Pickmere, Cheshire	20–29	22–24	?	91
Stanton, Somerset	20–29	24–26	?	95

† Westergaard (1943) reported that the average % of "good" pollen was about 90 in diploids but 60 in tetraploids.

* Material supplied by Miss K. Luck.



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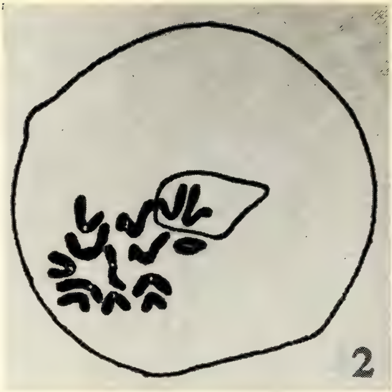

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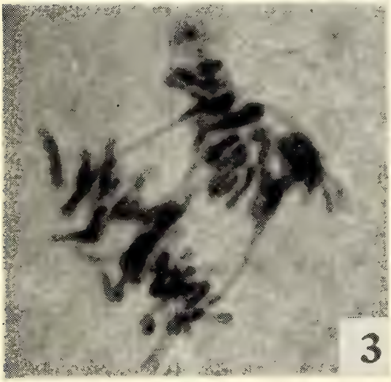

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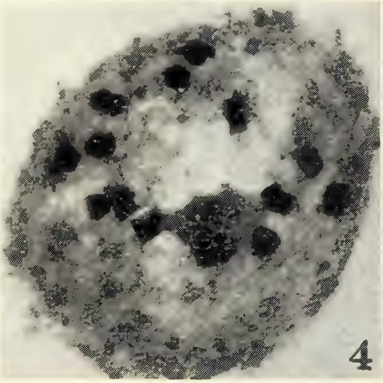

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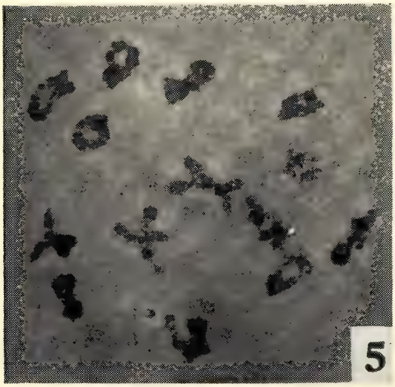

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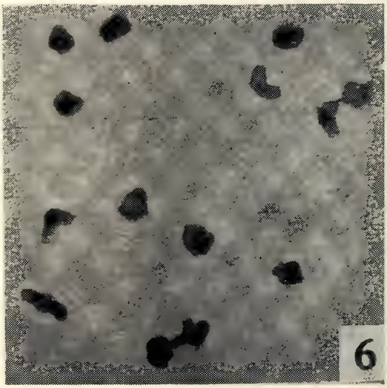

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$2n=28$ may have arisen by polyploidy. Thus while the $2n=28$ plants behave cytologically more or less as normal diploids and show over 90% "good" pollen there may be slight homology between some of the bivalents. Nygren (1946) claimed that he had observed multivalent formation in his diploid Swedish material. Westergaard (1943), however, stated that meiosis in diploids in Denmark was normal.

ACKNOWLEDGMENTS

We are indebted to Miss K. E. Luck (Botany School, University of Cambridge) for supplying fixed inflorescences and wish to thank the Director of the Herbarium, Kew, and Dr. A. J. Willis and Mr. I. W. Evans for further material.

PLATE I

No. 1. Second pollen mitosis with 12 chromosomes visible, two being concealed by the tube nucleus. Acetocarmine stain. × 1500. Material from Pwll-du-Bay, Glamorgan.

No. 2. Camera lucida drawing of the pollen grain in No. 1 reduced to the same scale and showing the 14 chromosomes.

No. 3. Two bridges at anaphase of mitosis in a root-tip cell. Feulgen stain. × 1500. Material from Cheddar Wood, Somerset.

No. 4. Diakinesis in pollen mother cell showing 14 bivalents two of which are connected to the nucleolus. Acetocarmine stain. × 900. Material from Braunton Burrows, Devon.

No. 5. Diplotene-diakinesis in pollen mother cell showing 14 bivalents and terminal and interstitial chiasmata. Acetocarmine stain. × 1350. Material from Braunton Burrows.

No. 6. Early metaphase I in pollen mother cell with connections between two bivalents at top right and bottom centre. Acetocarmine stain. × 1350. Material from Braunton Burrows.

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THE RADSTOCK PLATEAU—

A Note on the Physiography of the Bristol District

By S. W. Wooldridge, F.R.S.

(King's College, London)

THE purpose of this paper is to institute a comparison between the land-forms of South-East England and those of the West Country, if I may so term the area of which Bristol is the effective centre. The approach so indicated is the one which I have necessarily followed by virtue of the fact that my College was evacuated to Bristol from 1939–43 and resumption of field-work, so far as War conditions allowed, was inevitably against the background of my home area (the London Basin and The Weald). Whether in urban geography or geomorphology, the Cockney resident in Bristol will be urged to certain natural, almost inevitable comparisons.

The rich endowment of the Bristol area for geological study needs no emphasis ; it would always be my first choice as an area for effective study of the Earth sciences. Even if it has little to offer the igneous petrologist, this loss is or might be made good by its signal advantages for the study of geomorphology. These result from its position on or near the junction line of the uplands and the lowlands of Britain where the older rocks of Wales and the Cornubian peninsula adjoin their younger successors. The same contrast in juxtaposition perceived in Thuringia by J. G. Lehmann was powerfully influential, 200 years ago, in clarifying the essential method of reading geological history.

In more detail we may say that the West Country lies between South-East England where a full story of the later chapters of Geological History can be deciphered, and South Wales or Devonshire, where older rocks and the uplands they build dominate the scene.

In two important respects the West Country is ' of one piece ' with South-East England. Though its rock-succession is wholly different, being sub-Cretaceous, the structural lines of the West continue into the South-East. In a famous book(*1*) well-known at least to older students of the subject, Jukes-Browne's " Building of the British Isles ", the author shows how the late Palaeozoic or Armorican folds of South-West Britain may be regarded as continued into the South-East not only in the older rocks of the

‘ Palaeozoic floor ’ deep below the surface but expressed by renewed or recrudescent movement in the younger rocks which cover the floor. Basing his account on the suggestions of Professor Boyd Dawkins and Dr. A. Strahan, he distinguished in the area west of Bristol four main anticlinal axes : (1) The Cardiff anticline, (2) The Mendip axis, (3) The North Devon axis, and (4) The South Devon axis. The first, well-marked west of Cardiff, re-appears in our area at Portbury and hence crosses the Bristol coalfield to near Mangotsfield. The eastern continuation of the Mendip axis he regarded as marked by the Pewsey anticline and thence along the northern side of the Weald to Hythe and Cap Gris Nez. His North Devon axis is marked by the Exmoor upland, the Sedgemoor anticline, the sharp fold of the Vale of Wardour, whence he traces it into one or other of the Central Wealden axes. The South Devon axis hardly concerns our area passing from North Cornwall via Dartmoor to Dorset and the Isle of Wight before swinging south-eastwards into the Bresle axis of North France. This older account indicates no eastern continuation of the Cardiff fold, but in 1926(*2*), having demonstrated the recurrent tendency to anticlinal uplift along the line of the lower Thames Valley, I ventured to identify this line as marking the sub-surface range of the Cardiff–Bristol fold. This, be it noted, would place the Kent coalfield as the structural analogue of the Radstock coalfield. Of much greater importance for our present discussion was the demonstration in 1930 by O. T. Jones(*3*) that the Mesozoic rocks of the Bristol area were themselves traversed by East-West folds, closely similar in character and pattern to those of Alpine (Miocene) date in Wessex and South-East England. To these we shall refer again below.

There is thus clear and long recognized evidence of structural linkage between the West Country and the South-East. The second element common to the two is in having shared the long atmospheric wear and tear of Tertiary time, estimated by radioactive dating as having a duration of 65–70 million years. We are so habituated to a stratal or stratigraphical measurement or filling of geological time that there is a tendency to ignore or at least to underrate the long complementary erosion intervals. The absence of Tertiary deposits from the area evidently does not imply the absence of Tertiary erosion. From Kelston Round Hill we can sight in clear weather the receding edge of the Chalk in Wiltshire and are thus led to recall that all this and much more has been stripped from our region in the course of such erosion. One of the most significant recent developments in the study of land-forms is the recognition that such stripping need not be ascribed vaguely to ‘ sub-aerial denudation ’ in one lengthy but unbroken course of destruction, as if analogous to the sweep of the geological lecturer’s duster, when he removes such a former cover of “ top strata ” from his sections to lay bare the surface as it is now. Denudation, no less than deposition, takes place in successive recognizable stages, marked by erosion surfaces of low relief, “ peneplains ”, which may however be buried or at least veneered by the deposits of the sea advancing across the base-levelled surface. We cannot here review at length all the theoretical and disputable points involved in this conception of ‘ cycles of erosion ’ leading to base-levelling or peneplanation, but it may be worthy of emphasis that a cover of marine strata does not prove that the surface on which they rest (*e.g.*, in the famous section at Vallis Vale) is a “ plain of marine denudation ”. To such a conception, the British observer, conditioned perhaps by his sea-girt environment, tends to be over-addicted, but as Geikie(*4*) wrote nearly a century ago “ Before the sea advancing at a rate of 10 ft. per century could pare off more than a mere marginal strip of land . . . the whole land might be washed into the ocean by atmospheric denudation.” It is of course readily conceded that the waves of a sea, advancing across land already base-levelled, may trim the surface and perfect the planation, but they do not make the surface. There is indeed another complication in the Bristol area of which we must take account, *viz.*, the possible occurrence of “ fossil erosion surfaces ”—*i.e.* planes of unconformity exhumed from beneath covering rocks. The Bristol district indeed is perhaps the chief example in Britain of such exhumation of buried landscapes. In his “ Geological reverie on the Mendips ”, Professor Lloyd Morgan described the scene as it might have appeared in late Triassic times to our first mammal, “ an intelligent *Microlestes* ”, surveying the scene from the Western Mendips. The Keuper Marls being regarded as the deposits of a lake, the water would have been studded with islands marking the present sites of the Mendip ridge, Wrington Down, and the Clifton and Clevedon ridges. Against the flanks of all these uplands, the Keuper passes into its characteristic fringing marginal deposit—the Dolomitic Conglomerate. In these PROCEEDINGS for 1908(*5*) there is a map of Backwell Hill showing how this Conglomerate fills up old valleys, *i.e.*, ravines on island margins, recalling the more famous case at Charnwood Forest, where the same Keuper formation similarly fills old valleys. Despite the local appearance of such details of ancient physical pre-history, it remains true that our landscape as it exists is essentially the result of Tertiary fashioning. Even at Backwell, Brockley Combe is manifestly the work of the current or a recent cycle of erosion, though it is the neighbour of these old pre-Triassic valleys.

The clear demonstration of the existence of Tertiary erosion levels around Bristol was the work of the late Sir Arthur Trueman shortly before he left Bristol for Glasgow. His paper (*6*) is highly valuable, not only for the facts he records but by the clear explanation of the methods and principles of such work. It was this paper which was placed in my hands by Dr. F. S. Wallis as soon as I reached Bristol in 1939 and since it reviewed work of my own and a subject closely cognate to my chief interests, I immediately set to work to re-examine the area by way of Trueman's approach. I may say at once that I cordially and completely accept Trueman's conclusions. Nevertheless, at that time the force of his conclusions was by no means fully realized or understood.

I suppose the most spectacular erosion surface in the area is the surface of Durdham Down and its continuations. When the International Geological Congress came to Britain in 1948, Professor Miller and I brought the geomorphologists to Bristol to see this surface, *en route* from Cardiff to Salisbury. I was never inclined to regard it as a sub-Triassic surface in the light of the irregular gullied character of the Triassic base as seen, *e.g.*, in Bridge Valley Road. It was rather more possible to regard it as sub-Liassic, *i.e.*, planed by the waves of the Liassic sea, and this was the view to which I found the late Professor S. H. Reynolds inclined in 1939. Early in 1940, however, the error of this interpretation was put beyond question by a large bomb-crater at Westbury Park in Lias. The Downs surface here passes on to the Lias without break, showing that the surface is in any case post-Liassic. Trueman quotes similar examples in South Wales, and at Stanshawe's Court, Yate, where 12 ft. of littoral Keuper succeeded by Tea-Green marls was banked against a cliff of quartzite, the erosion surface passing unbroken across the junction. One may add that one has only to look northward from Henbury Hill to see its summit surface ranging northwards between Hallen and Thornbury across Keuper and Lias. More generally, since with Trueman I accept O. T. Jones' demonstration of post-Liassic folding, any pre-Liassic platforms can hardly remain unwarped.

The sequence of platforms discovered by Trueman is as follows: (1) 750–800 ft. (as in the Mendip and High Cotswold summits), (2) 550–600 ft., (3) 400–450 ft. and (4) 200–300 ft. Of these the last is the most widespread and, like Trueman, I have some difficulty in separating it clearly from No. 3. The sequence as

Trueman notes is closely similar to that of the London area and to this I must now briefly turn. The succession of events has been worked out in detail by D. L. Linton and myself (7).

The major erosion surfaces of South-East England are as follows:

(i) The high crests of the Chalk country, in the Chilterns and around the Weald and westwards through Wessex, are remnants of a surface of low relief—a true peneplain—produced by the long-continued atmospheric wastage which followed the mid-Tertiary folding of the area. This was the view of W. M. Davis in 1895 and it has been fully borne out by later work. The general level of this surface is about 800 ft. above sea-level—a plane at this height would pass close to all the higher summits of the area. Rarely and locally it climbs to or just above 900 ft. as at Leith Hill (965 ft.) and Blackdown (918 ft.). Both these summits are on the resistant cherty Hythe Beds of the Lower Greensand. The Chalk summits fall between 700 and 900 ft. (cf. Fig. 1). It is clear that the surface so indicated is younger than the mid-Tertiary folding and may be dated as Mio-Pliocene. Upon it most, if not all, of the true residual Clay-with-Flints is found.

(ii) A surface of equal regional importance has been laid bare in the later dissection and wearing down of the area, *viz.* the early Tertiary plain on which the Eocene deposits rest. The Chalk sea-floor was raised into land and subjected to long erosion before the earliest of these deposits was laid down. No doubt the waves of the Eocene sea completed the planation of the surface, but it is essentially a peneplain and since it is older than the main folding movement, it is strongly warped or tilted, forming the true dip-slopes around the London Basin, as might be readily verified by walking from Epsom station to the Grand Stand on the Downs, an ascent of 250 ft. in 1½ miles. Here is a clear example of a "fossil" erosion surface, unexposed to atmospheric attack until its Eocene over-burden was removed, and by reason of this relatively recent exposure, destitute of Clay-with-Flints cover.

There are thus two major peneplains in the South-East, respectively pre- and post-folding and we might expect to find either or both of these represented in Western areas of older rocks. There is no reason to doubt that the summit-plain of Mendip, resumed in the high summits of the Cotswolds and of Dundry Hill, represents the Mio-Pliocene surface. If one stands on the latter at Bratton Castle within sight both of Lansdown and the Cranmore Tower on Mendip, this correlation appears entirely reasonable and acceptable.

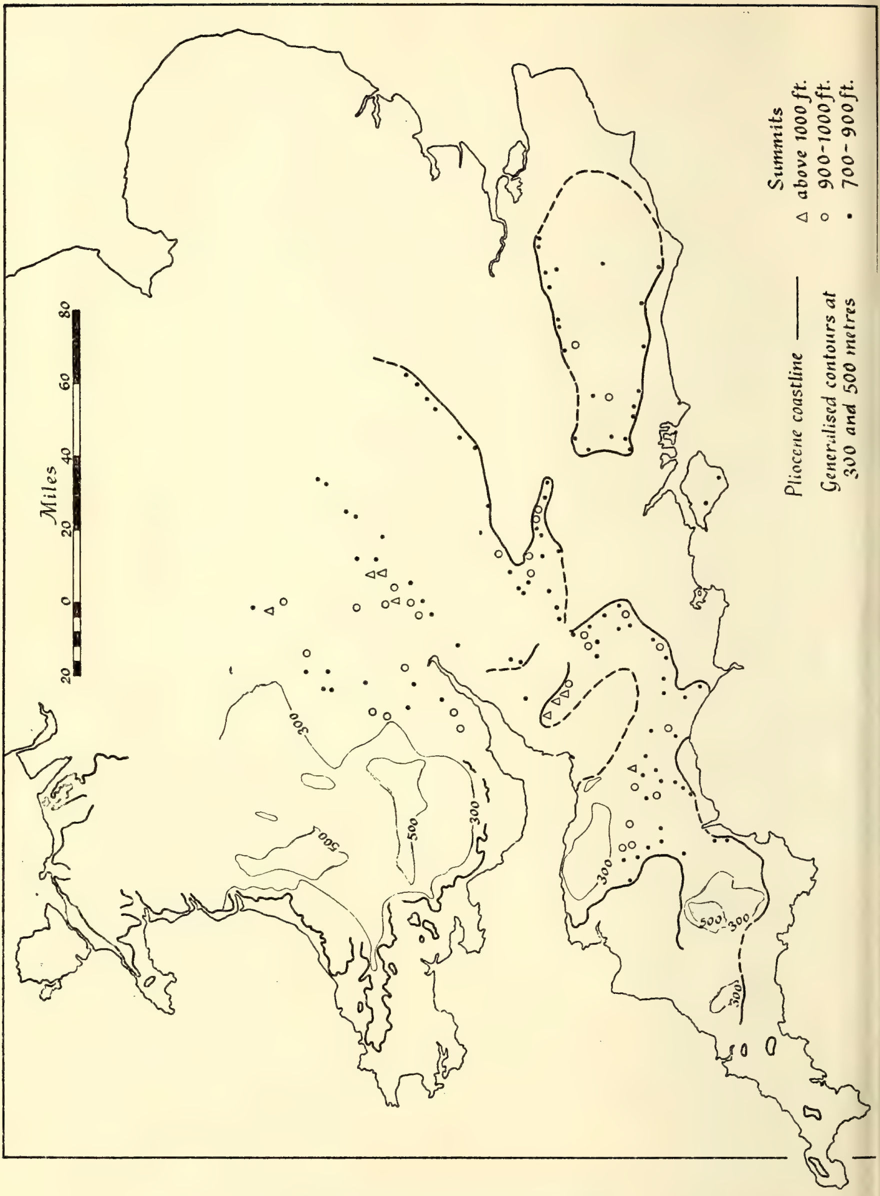
Miles
20
0
20
40
60
80
Summits
△ above 1000 ft.
○ 900-1000 ft.
• 700-900 ft.
Pliocene coastline
Generalised contours at 300 and 500 metres
300
500
300
500
300
300
500
300
300

FIG. 1. The Summit Levels of S.E. England.

There is, however, another surface in the South-East to which we must now attend. Below the hill-top plain is a conspicuous surface cut in Chalk, but passing locally onto the Eocene cover. Its elevation in round terms is 600 ft. (say 550–690 ft.). Upon it rest some fifty outliers of marine sand and shingle, shown to be remnants of a single formation by a highly distinctive suite of heavy detrital minerals, by which too they can be distinguished from the Eocene beds. All earlier references(*8*) to these beds assumed that they were correlative with the Lenham Beds (or Diestian stage of the Continent) first clearly distinguished by Prestwich in 1857 and regarded as of early Pliocene or even possibly of late Miocene age. More recent discovery of fossils has changed the position, for an unmistakeably *Red Crag* fauna was obtained at Netley Heath(*9*) and later at Rothamsted(*10*) on the other side of the London Basin. Since most of the outliers have yielded no fossils, it was, and is, simply a question of associating the deposits with the Lenham fauna or the much younger Netley and Rothamsted fauna. The latter taken as Waltonian (in British terms ; = Calabrian of Southern Europe) is now authoritatively regarded as marking the base of the marine Pleistocene. It is possible though as yet unproved that the sheet of deposits is diachronous, older in the east than the west, but it seems likely that all the deposits near and west of London are of the same age and can be reckoned not as Pliocene but early Pleistocene or at any rate Plio-Pleistocene.

Physiographically the question of precise age is of little moment, if we hold to the fact that the surface (the " sub-summit plain ") of the area, separated from the Mio-Pliocene peneplain by a distinct bluff—a degraded coastline feature—is older than the hills and valleys of the area which are the product of land sculpture since the emergence of the Plio-Pleistocene sea-floor. This was the time when South-East Britain last " at Heaven's command, arose from out the azure main " and the coastal bluff as seen, *e.g.* at Headley Heath in Surrey or near Whipsnade Zoo, marks, so to say, the latter-day high water mark of the South-East—the highest of the raised beaches.

The high importance of this ancient strand flat is that it is almost the only case in the findings of British geomorphology in which a *platform* is associated with dateable deposits of undoubtedly marine origin. In raising the question of its presence in the Bristol district, we may note at once that a probably equivalent surface is already known in East Devon (*11*), in the Exmoor region (*12*) and throughout Wales (*13*, and *cf.* Fig. 1). There is thus warrant for an attempt to link the western confines of the south-eastern region, formerly studied, with the West Country. In our earlier study, Linton and I brought what we regarded as the Pliocene—we must now say Plio-Pleistocene—coastline to within 25 miles of Bristol, near Warminster. Our reconstruction was guided by two assumptions : (i) that the base of the terminal bluff was at about 650 ft. and that the extent of the marine trespass was significantly correlated with the fact that the drainage necessarily started *de novo* on the emerged sea floor and was hence *superimposed* across what at an earlier date must have been anticlinal ridges. We originally extended the sea in an embayment up the Wylie Valley west of Salisbury to near Heytesbury. Later work suggests that, at least in the west, the rearward level of the strandflat was nearer 700 ft. than 650 ft., say 690 ft. It is also clear that the northward flowing headstream of the Wylie in the Deverill Valley transects the Warminster anticline (note the inlier of Gault at Crockerton) so that the argument for superimposition can fairly be invoked. It is therefore probable that a marine strait crossed the Chalk ridge in this vicinity and thus gave access of the sea to the West Country. The hills north of Warminster, Battlesbury (682 ft.) and Arnhill Down (695 ft.), are rather too high to suggest a continuance of the strandflat surface, but from there the surface can be clearly seen south of the main valley as at Whiten Hill, Cow Down, and near Longbridge Deverill, backed by the higher ground of the Mio-Pliocene peneplain near Bidcombe Down (876 ft.) and Little Down (Beech Clump 784 ft.). In this area indeed is one of the most impressive and best preserved remnants of the peneplain (7, p.38). Direct westward passage of the sea from Warminster is blocked by the high ground of Cley Hill and Park Hill (800 ft.). North-westwards along the line of the Bath road there is no such obstacle and it is gratifying to note that 8 miles north-west of Frome the Jurassic escarpment, here capped by the Forest Marble, culminates just above 600 ft. in four small areas between Mells Down and Terry Hill. These summits are the most south-easterly elements of what may fitly be termed the Radstock Plateau. This surface first attracted the writer's attention on the hills south of Bath, *e.g.*, Odd Down, from where the high bastions of the southern Cotswolds may be seen rising steeply above it, beyond the Avon valley, just as the crests of the North Downs rise above its south-eastern analogue say near Caterham Barracks or the Whipsnade Zoo.

We can most concisely state the range of the surviving relics of the dissected plateau by listing the closed contours culminations at 550 or 600 ft. in the area, shown on the map (Fig. 2). They are as follows :—

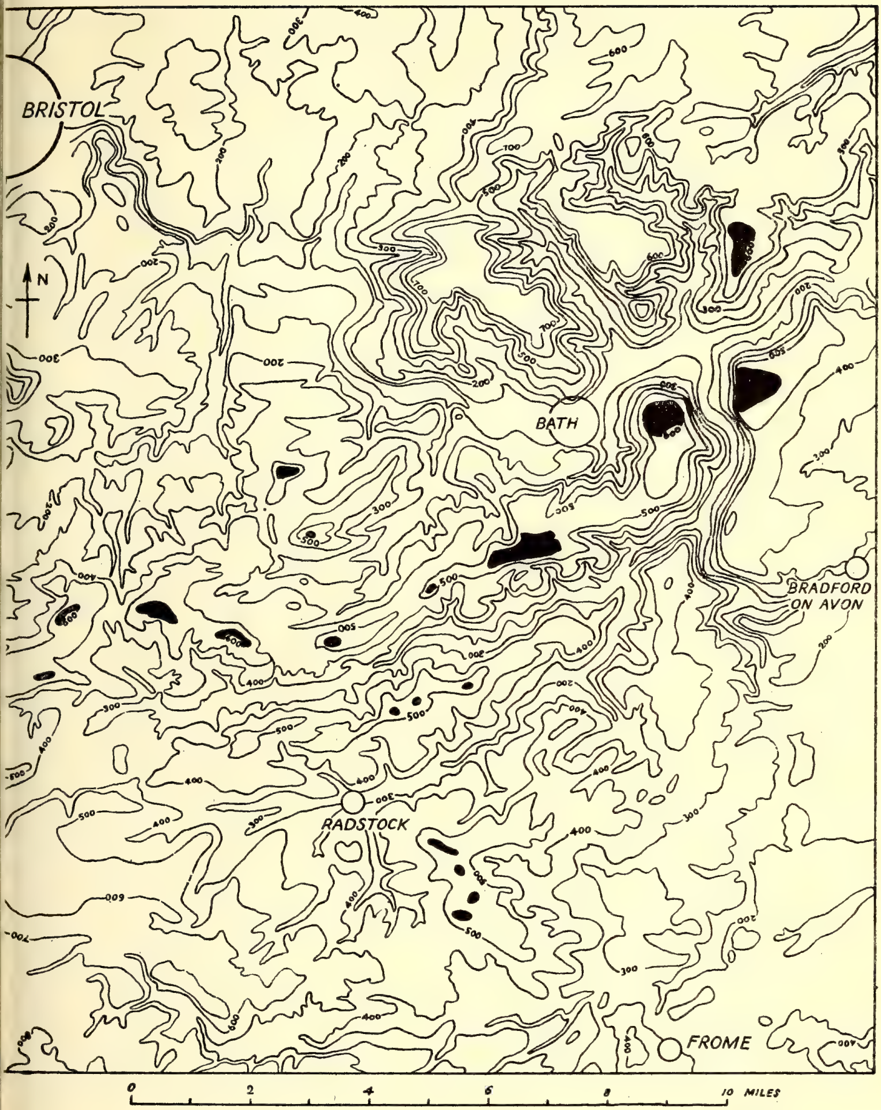
BRISTOL
N
BATH
BRADFORD ON AVON
RADSTOCK
FROME
0
2
4
6
8
10 MILES

FIG. 2. The Radstock Plateau. Summits above 550 and 600 ft. are shown in solid black.

Locality	Formation	Height
Farleigh Down, Browns Folly	Fuller's Earth and Gt. Oolite	600+
Bathampton Down	Great Oolite	672
N. of Fosse Farm	” ”	587
Duncorn Hill	” ”	550+
Tunley Hill	Inf. Oolite	554
The Sleight (Timsbury)	” ”	650+
Barrow Hill	” ”	680
Blackberry Hill	” ”	625+
Huddox Hill	Fuller's Earth	550+
Stantonbury Hill	Inf. Oolite	584
Terry Hill	For. Marble	600+
Nap Wood		600+
Buckland Down		600+
Burledge Hill (W. of Clutton)	L. Lias	572

To this list we may add, in the area, north-east of Bath, Solsbury Hill (618 ft.) and its eastern neighbour north of Banner Down, bisected by the Fosse Way (620 ft.).

Thus the culminating levels are accordant over an area of some 150 sq. miles and the surface as a whole bevels the structure like a plane of unconformity stepping from Forest Marble across on to Lias. As a whole therefore the surface is clearly not a structural surface. The supporting rocks, it is true, are all calcareous and in a flat or gently inclined "table-like" attitude. This invites the foolish and quite untenable error of supposing that the calcareous cap-rocks are the simple and sufficient cause of the summit flats. The truth is, of course, that the relatively resistant calcareous elements *preserve*, but do not *cause* the plateau in question. This principle, clearly brought out by the work of the late A. J. Bull and emphasised by Trueman, is a vital one. Failure to comprehend it may fairly be dubbed the *pons asinorum* of this branch of work. Nowhere within the area indicated does the platform abut against rising ground. Trueman's most extended reference to the 600 ft. surface is to the area around Ston Easton, stretching to Chewton Mendip and southward to the Mendips. Here near Emborough, Chilcompton and Leigh it might well be possible to trace a boundary bluff. Trueman also noted the passage of the platform from Lias on to Keuper, Coal Measures, and Carboniferous Limestone, as on Broadfield Down. Although, therefore, the 600 ft. platform in its dissected state is by no means so extensive as the lower surface at 200–300 ft., it is preserved to a significant extent and in relation to areas both to eastward and westward its features merit attention and study. The relation of the Cam and Wellow Brooks to the platform is certainly suggestive of streams initiated upon it and formerly draining eastward to the Kennet-Thames. The broad breach in the eastern wall of the Limpley Stoke valley north of Conkwell offers a former route across the Vale of Melksham.

THE PLATEAU GRAVELS

A question immediately arises concerning the presence or absence of deposits upon the 600 ft. surface. The presence of flint nodules and pebbles on the hill-tops above the Avon valley was noted by Conybeare as long ago as 1822. A more explicit reference is by C. H. Weston(*14*) who records (1850) quartzose flint-bearing gravel on Farleigh Down. This occurrence was noted in 1890 by Prestwich(*15*) in his attempt to trace his Westleton Beds westward beyond the London Basin. In 1921, W. D. Varney(*16*) recorded similar deposits on Bathampton Down where in a matrix of reddish-brown sandy loam he records :

Angular and sub-angular flints.
Flint pebbles—broken by frost.
Many quartz pebbles.
Flat pebbles of sandstone.
Pieces of quartzose conglomerate.
Fragments of shale.
Rare pieces of coal.
Rolled and sub-angular pieces of Oolitic limestone.

The provenance of these constituents presents no particular problems : the quartz and conglomerate can be matched in the upper Old Red Sandstone ; the shale and the coal are certainly from the Coal Measures. Varney, in pursuance of his hypothesis of an early Avon with Welsh headwaters, sought the latter in South Wales but it is evidently more likely that the source was the Somerset coalfield—a much shorter journey for the readily disintegrated coal.

It must be admitted that there is little in these deposits apart from the rounded but broken flint cobbles to suggest a marine origin. Eyes familiar with the drift deposits of the London Basin would see in this assemblage and its loamy matrix the analogue of the older higher level deeply weathered boulder clay of (say) Hertfordshire. Though clear and definitive proof of such an origin is lacking, to regard the deposits as an early Pleistocene drift is at least consistent with the age now assigned to the deposits on the 600 ft. platform further east.

In conclusion we may refer to the note on the 'Age of the Clifton Gorge' published by Dr. Greenly in these PROCEEDINGS in 1947. On a basis of general reasoning but without taking account of the

600 ft. surface or its re-dating, he assigns a Pliocene age to the Downs surface, assuming its equivalence with the 400 ft. platform in Cornwall and Devon. This has been commonly regarded as Pliocene, being rather precariously linked with the St. Erth Beds. These, however, are at a much lower level and, pending a revision of their fauna, the age question must rest unresolved. The surface however is younger than the 600 ft. surface and must fall well within the Pleistocene. It seems not unlikely that it may mark the sea-level of the First Interglacial period. If this guess proves correct the Gorge would mark the falling sea-level of the Second or Antepenultimate Glaciation. The implications of this suggestion for local Pleistocene chronology cannot be pursued here.

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BEACH DRIFT EXPERIMENTS AT BRIDGWATER BAY, SOMERSET

BY C. KIDSON AND A. P. CARR

SINCE the beginning of 1955, experiments have been carried out on the coast of Somerset, to the west of the River Parrett, using marked material to study the nature of shingle movement. Some of the information obtained from this work has already been, or is being, published (Kidson, 1960; Kidson, *in litt.*) and it is the purpose of this paper to give a comprehensive picture of all the experiments. The research in this area is complementary to that which has been done by the Nature Conservancy's Coastal Section and others at Orfordness, Scolt Head Island and other sites on the East Coast (Kidson, Carr and Smith, 1958; Kidson and Carr, 1959). This experimental work on the movement of beach material, both alongshore and over the sea bed, and including sand and silt as well as shingle, is designed to give a greater understanding of shoreline features of deposition such as sand and shingle spits, storm beaches and salt marshes. The Bridgwater Bay experiments, carried out along the six mile stretch of coast to the west of the River Parrett, and which form the subject of this paper, are thus part of a wider design. The coastline in this area is very different in type from that on the East Coast where other drift experiments have been carried out. The methods employed have also differed widely, partly in relation to the different conditions.

THE EXPERIMENTAL AREA

From the most westerly experimental area at Lilstock (Fig. 1) to the most easterly at Stert Point, the coast of Bridgwater Bay shows both uniformity and diversity. Throughout the whole, the beach material is composed mainly of Liassic limestone and Devonian sandstone, but the cliffs and limestone "pavements" of the west give way eastwards to a low coast fronted by mudflats. This change is not gradual but there is an abrupt break near Hinkley Point. The cliffs are highest in the west where they reach about 80 feet, while near Hinkley Point they are of the order of only 5 to 6 feet. The limestone pavement fronting the cliffs is a largely continuous rock abrasion platform. The angle of dip of both cliff and pavement varies widely. This stretch of coast includes a number of ill-defined headlands, and bays in which intermittent shingle ridges are piled up. The shingle in

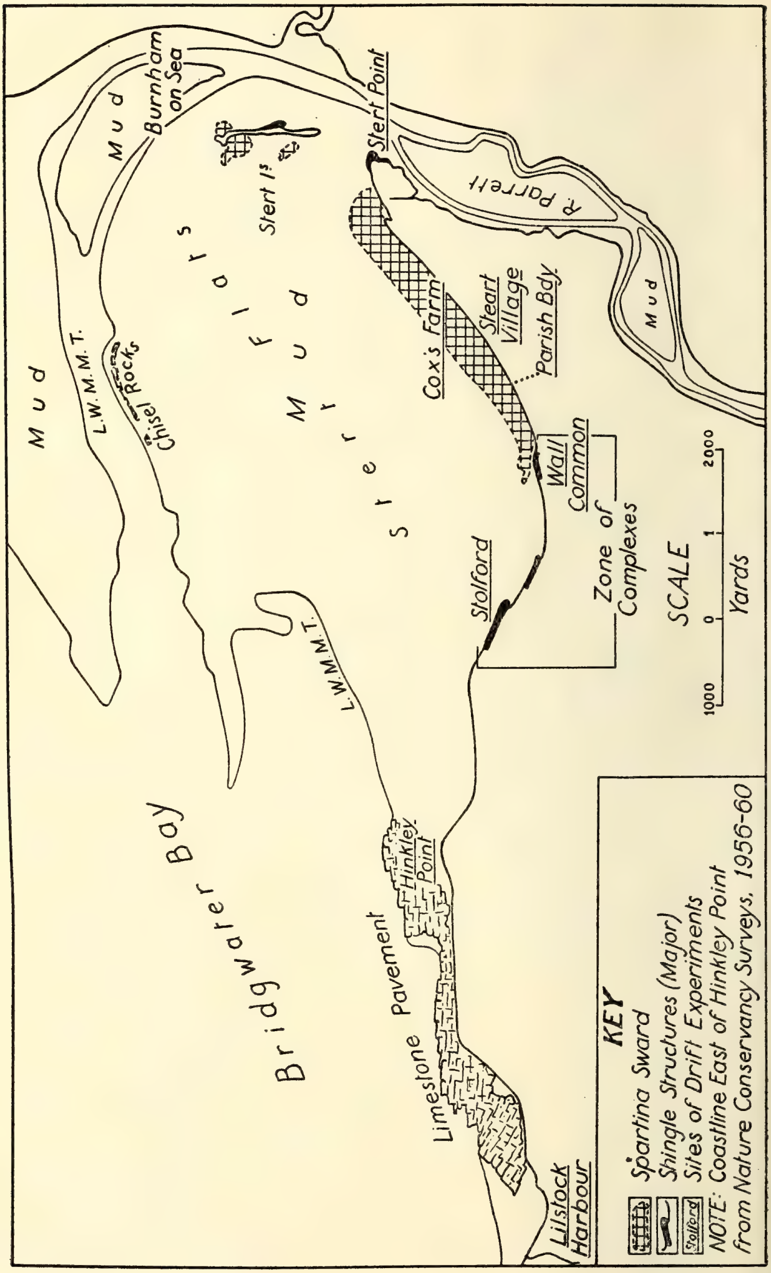
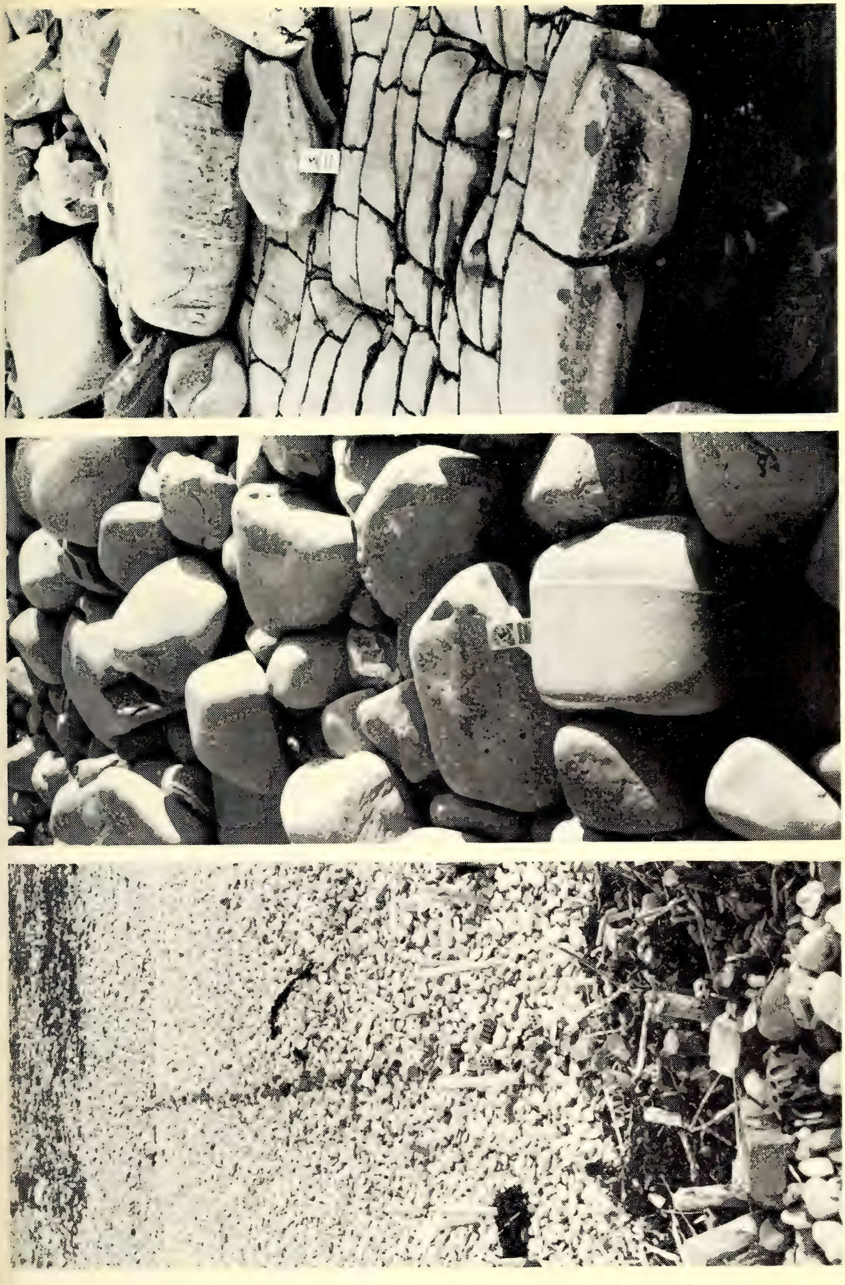
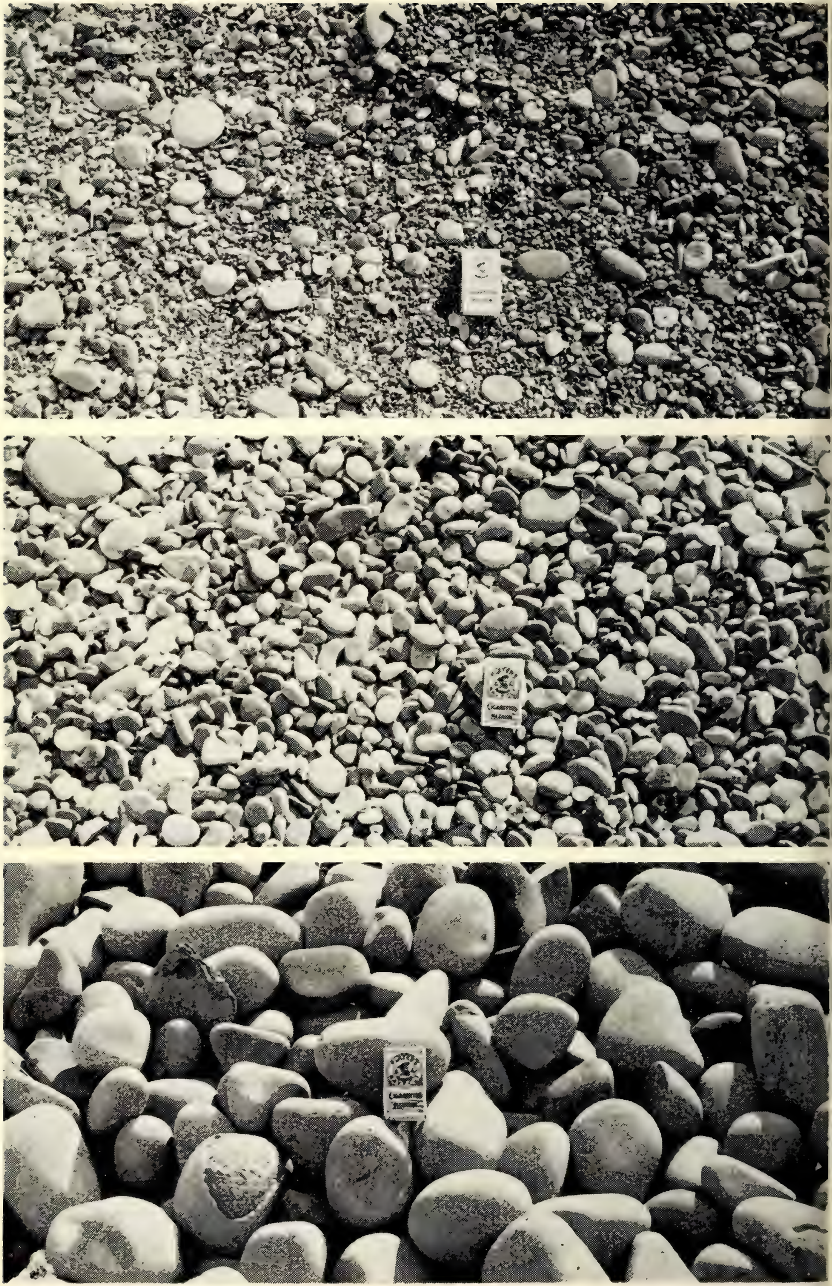

Mud
Burnham on Sea
Mud
Stert Point
Stert Is
R. Parrett
Mud
Stert Mud Flats
L.W.M.M.T.
Chisel Rocks
Cox's Farm
Steart Village
Parish Bdy
Wall Common
Zone of Complexes
Stolford
SCALE
1000
0
1
2000
Yards
L.W.M.M.T.
Bridgwater Bay
Limestone Pavement
Hinkley Point
Lilstock Harbour
KEY
Spartina Sward
Shingle Structures (Major)
Stolford
Sites of Drift Experiments
NOTE: Coastline East of Hinkley Point from Nature Conservancy Surveys, 1956-60

Fig. 1. Bridgwater Bay: sites of drift experiments.



Top : Limestone pavement between Lilstock and Hinkley.
Middle : Beach cobbles derived from the limestone pavement.
Bottom : Injection site at Stolford Farm (*23rd March, 1955*).



Wall Common: shingle size variations

Top : Bottom of beach

Middle : Face of beach ridge

Bottom : Crest of beach ridge

these varies in amount, size and composition. In part, this is a result of the peculiar hydraulic conditions here, but more especially it is a reflection of the spasmodic supply of beach material. Both the cliffs and the " pavement ", with their well developed jointing, are sources of limestone blocks. These are initially large and angular (Plate II, top) but ultimately progressively smaller and more rounded (Plate II, middle, and Plate III). In addition the sandstones, which are also present, may come either from the west or from the solifluction gravels overlying the cliffs. Under present conditions these gravels are the major source.

Apart from a small outlier of the limestone abrasion platform exposed at Stolford, the coast to the east of Hinkley is a shingle storm beach fronted by large expanses of mudflats and backed by low alluvial land. For at least the last 150 years most of the area has shown a marked tendency to erode, as the presence of both sea walls and groynes testifies. However, in the zone of shingle complexes, between Stolford and Wall Common, it can be demonstrated that deposition has been dominant for much of this period (Kidson, 1960). The recent planting of *Spartina* grass to the east of Wall Common, and its spread almost to Stert Point, has produced rapid deposition resulting in a marked raising of the foreshore. Here too erosion has given place to accretion. The bulk of the beach material in this area appears to be derived ultimately from the west though some small local sources, such as the patch of Devonian gravel at Stolford Farm, do exist.

One of the chief factors governing the rate of movement of beach material along the whole of this part of the coast is the relatively short period during which the tide actually reaches the shingle storm beach or the cliffs. Broadly, this length of time decreases towards the east except close to the Parrett estuary, in the Stert Point area, where different conditions prevail. Thus, immediately to the east of Lilstock, the cliffs are subject to attack for a period each day, even during neap tides, while in the vicinity of Steart village and Cox's Farm, behind the protective *Spartina* sward, the storm beach is now reached by waves only at high water springs, and only then under exceptional storm conditions (Kidson, 1960). In this respect, if in no other, the *Spartina* has merely emphasised a condition that was always present to a considerable extent.

THE INJECTION SITES

At an early stage in physiographic studies on the coast near the mouth of the River Parrett it became apparent that information was needed on the direction and speed of movement of beach material. For this purpose a series of experiments was designed making due allowance for the particular local configuration of the coast and the form of the beach material. At the beginning of the experiments, markers were laid down at seven sites (Fig. 1) between Lilstock and Cox's Farm. At a later date Stert Point was added. Lilstock was chosen since it provided a position on the open coast, and both there and at Hinkley Point the sites were subject to wave attack for a much longer period than the areas further east. Hinkley Point is also the eastern limit of deep water close inshore. Further east, wave energy is attenuated by the passage of waves over the wide mudflats. Stolford and Wall Common were selected since they were in the zone of shingle complexes where, unlike at Hinkley, deposition rather than erosion was dominant. The " Parish Boundary " site, together with those at Steart Village and Cox's Farm, was influenced by the protective *Spartina* sward. Stert Point, beyond the eastern limit of the *Spartina*, was a site subject to the influences of the estuary. Three of these sites are shown in more detail in Fig. 2.

At each site markers were laid down in a line normal to the beach. The line extended from the crest of the storm beach across the whole of the shingle on to the mud and sand flats beyond. Plate II (bottom) shows the upper part of the injection site at Stolford Farm at the beginning of the experiment. Since the belt of shingle is of variable width, the length of the line, along which the markers were disposed, was also variable. Each line was divided into zones. In the three western sites, these comprised High Tide, Intermediate and Low Tide zones. Eastwards of Stolford, a High Tide and a Low Tide zone only were differentiated.

MARKERS AND METHODS OF TRACING

The conditions at Bridgwater, which differed widely from those on the East Coast, made it necessary to employ very different techniques. On the East Coast the actual beach material was labelled with radio-active tracers. In the Bridgwater experiments fireclay markers were used. These consisted of bricks of a local pattern, each having a series of twenty holes. The surface labelling with radio-active tracers, possible with a relatively durable material such as flint shingle could not be employed with the Liassic limestone pebbles of this beach because of their poor resistance to abrasion. The brick markers possessed a number of advantages. They could easily be seen on a beach composed of grey limestone and purple sandstone pebbles. Like the limestone shingle, they began as angular fragments which later became rounded by beach

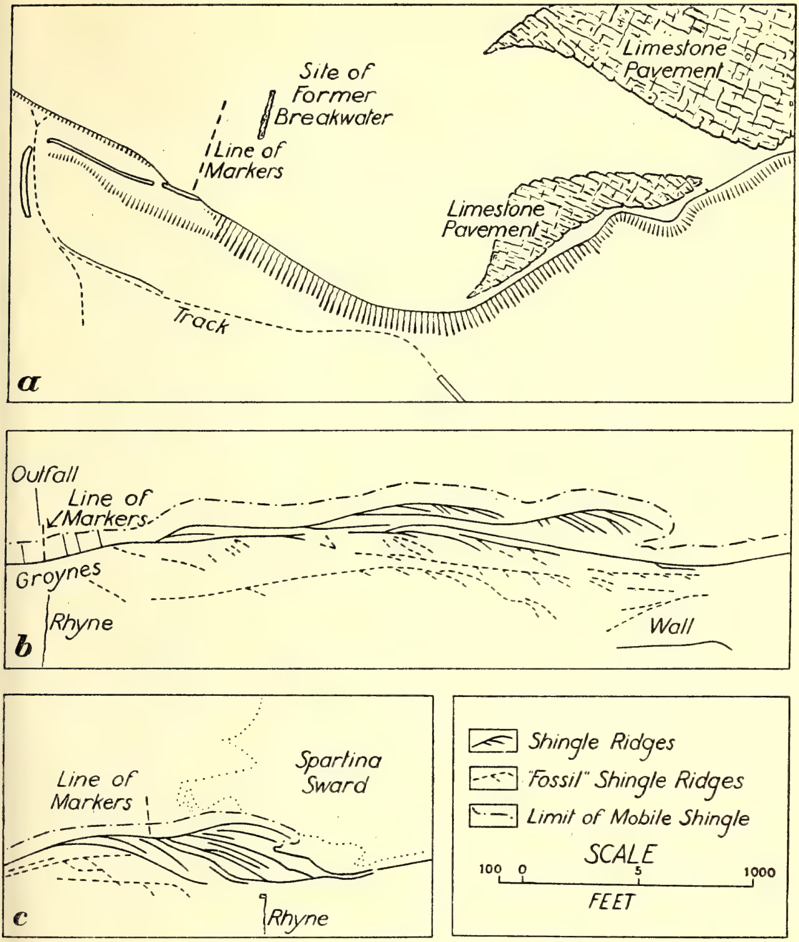

Site of Former Breakwater
Line of Markers
Limestone Pavement
Limestone Pavement
Track
a
Outfall
Line of Markers
Groynes
Rhyne
Wall
b
Line of Markers
Spartina Sward
Rhyne
c
Shingle Ridges
"Fossil" Shingle Ridges
Limit of Mobile Shingle
SCALE
100 0 5 1000
FEET

FIG. 2. Detailed site maps.

(*a*) Lilstock Harbour

(*b*) Stolford Farm

(*c*) Wall Common

processes. The specific gravity of the brick markers was reasonably close to that of both the limestone and sandstone shingle. A pilot trial with fireclay markers and labelled shingle from the beach showed that the markers were strictly comparable with the beach material in their passage alongshore. Lastly, the transverse holes made it possible to use galvanised wire tags for identification. On subsequent recovery it was possible to determine the initial size, initial site and the zone within the site itself, from which the marker had originated. The wire tags were supplemented by the use of marine paint which could be identified in the holes through the bricks even after a very long period of time.

The markers were of three sizes: whole, half and quarter bricks, hereafter referred to as sizes 1, 2 and 3 respectively. As far as possible, sizes of markers were chosen to conform to the range of size of shingle present in a particular site; numbers were related to the width of the shingle belt. Where, as in the most eastern locations, large beach material was not present, or merely represented an insignificant fraction of the shingle, only the two smaller grades, numbers 2 and 3, were used. Only at Lilstock Harbour, the most westerly experimental location, was any fraction of the beach material appreciably larger than the biggest markers employed. To confirm the impression that this large material did not move, a line normal to the beach was marked and at the end of two years was still in the same place.

In the initial stages of the experiment the beach was searched after each tide. Thereafter, searches were conducted at fortnightly intervals, *i.e.*, after each cycle of spring tides. The interval between searches was later increased to one month and finally to three months. The position of each marker recovered was established in relation to the original line and to the crest of the beach by chaining or pacing or both. Since the whole of the shingle was exposed at low water, provision for underwater detection was not necessary. The results of each search were plotted on a large scale map, the survey for which had already been completed by the Nature Conservancy's Coastal Section.

Intensive studies into shingle movement here began in January 1955 and ended some two years later in December 1956. During this period, it was found necessary to establish an additional site at Stert Point, and to supplement the markers at some of the original positions, to answer problems arising during the course of the experiments. Table I gives the dates on which markers were placed and the number of zones, quantities, and grades of markers used at each experimental site. Since December 1956 a periodic examination of the beach has been continued to enable the long term pattern of movement to be studied.

TABLE I. BRIDGWATER BAY : DRIFT EXPERIMENTS : DETAILS OF INJECTION SITES

Site	Date(s) of injection	Number of Markers	Sizes	Length of zones : feet from crest of Beach Ridge
Lilstock Harbour ..	28.1.55	462	1 2 3	0–140 High Tide † 140–280 Intermediate 280–420 Low Tide
Hinkley Point ..	28.1.55	237	1 2 3	0–73 High Tide 73–146 Intermediate 146–225 Low Tide
Stolford Farm ..	28.1.55 23.3.55	34 202	1 2 3	0–70 High Tide 70–140 Intermediate 140–210 Low Tide
Wall Common ..	17.2.55 28.3.56	84 150	2 3	0–120 High Tide* 120–240 Low Tide
" Parish Boundary "	17.2.55	72	2 3	0–18 High Tide 18–35 Low Tide
Steart Village ..	17.2.55	72	2 3	0–47 High Tide 47–94 Low Tide
Cox's Farm	17.2.55	72	2 3	0–50 High Tide 50–100 Low Tide
Stert Point	28.3.56	126	2 3	0–49 High Tide 49–99 Low Tide

† At Lilstock Harbour, these terms mean literally what they say. The terminology has been retained throughout even though elsewhere the low water mark is well below the lower limit of the line.

* The injection line at this site extended well on to the mudflats to ensure that no movement over the *Spartina* sward, which begins here, should pass undetected.

RATES OF RECOVERY

In all the experimental sites, recoveries in the first few months were very high. At the lower end of the original injection lines, little movement took place and recoveries were virtually 100%. Of those which moved, the number accounted for never fell below 50% in the first six months and was often very much higher. In the seventh and eighth months, however, many of the markers which had travelled alongshore and which were disposed in the beach ridge were buried because of the combing down of the ridge in a period of stormy weather. Thereafter recoveries of these markers never reached the original high values. This fact is, in itself, significant in illustrating one way in which beach material is lost to circulation by incorporation in the beach ridge.

The methods of marking proved highly successful. At Lilstock less than 2% of the markers had lost their galvanised tags at the end of two years. Elsewhere results were even more satisfactory. Where marine paint was used to supplement wire tags, no difficulty was encountered in identification even after more than 6 years.

MOVEMENT OF MARKERS

It very quickly became apparent that the experimental sites could be divided into those where appreciable movement took place and those where almost no travel of any kind was recorded. At the " Parish Boundary ", Steart Village and Cox's Farm sites, all of which lie behind the protective *Spartina* sward, the markers remained *in situ* for virtually the whole initial period and, indeed, for more than 6 years. At Cox's Farm slight movement took place but, even here, the furthest travelled marker was less than 150 feet from the point of injection after two years. At the remaining five sites, Lilstock Harbour, Hinkley Point, Stolford Farm, Wall Common and Stert Point, movement, generally in an easterly direction, but sometimes towards the west, began immediately and continued intermittently throughout the period. Speed of movement recorded was, however, by any standard of comparison extremely slow. The maximum travel in 2 years was less than at Orford, Suffolk, in one month (Kidson, Carr and Smith, 1958). A mass of data on movement in each site has been accumulated and it is clearly impossible within a single paper to record the whole of it. Selective examples will be given to illustrate the points of greatest interest which arose.

The pattern of movement at Lilstock (Fig. 3) shows features which were common to all the remaining areas where movement took place. At an early stage in the experiment the upper part of the line, *i.e.* the High Tide zone, was swept clear of markers which were then carried alongshore and were found thereafter as part of the beach ridge. The bulk of the markers in the Low Tide zone and in the Intermediate zone remained on, or very close to, the original line, throughout the whole of the experiment. Even after 6 years, as many as 70% of the markers, originally placed at the bottom of the line, were to be found within 80 feet of it. Only a very few found their way to the beach ridge. Lilstock

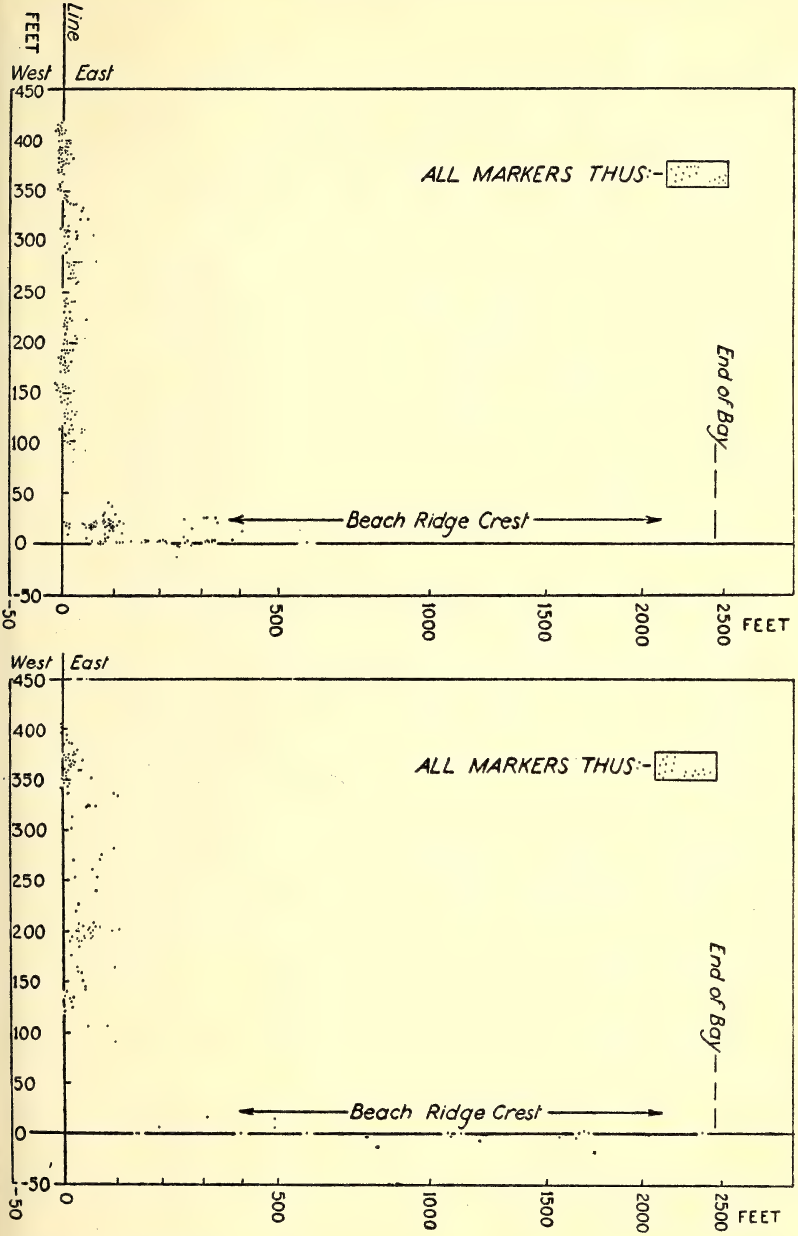


FIG. 3. Lilstock Harbour: distribution of markers after five months (*above*) and after two years (*below*).

is the one area where beach material is found of a greater size than that of the largest markers used. It could therefore be argued that the indications of lack of movement at the lower end of the line were the direct consequence of the trapping of the marked material by the large shingle. This undoubtedly contributed in some way, but it must be noted that the large material was much more common in the Intermediate zone. The end of the Low Tide zone of the original line was in fact in sand and mud. There was nothing to impede movement at the base of the line, yet there movement was negligible. The same pattern repeated itself at all the other sites where movement took place and it is apparent that movement is virtually confined to a narrow belt close to the limits of high water. This impression is confirmed by the broad belt of " static " shingle, partially buried in the mud of the foreshore, and on most of the beach separated along a clear cut line from the clean " mobile " shingle towards the top of the beach. This same pattern of movement is shown at Stert Point where widely different conditions prevail. The overall size of beach material here is much smaller yet only those markers in the High Tide zone were moved alongshore. Fig. 4 shows that the part of the original injection line resting on the " static " shingle remained *in situ.* The Stert Point site shows another feature common throughout. Once the marked material from the High Tide zone had been swept alongshore and incorporated into the beach ridge, further developments related almost solely to the longshore progression of this material towards the end of the shingle structure, in this case the terminal spit.

Another feature revealed by the results at Lilstock and Stert Point, which is characteristic of the whole area, and which is, indeed, to be found on any coast, as for example at Orfordness, (Kidson, Carr and Smith, 1958) is the number of markers which were thrown to the top of the beach ridge. These remained there for long periods until they were again moved by waves on an even higher spring tide or under more severe storm conditions. Some of these markers could be found in the same position for month after month before they were finally reintroduced into circulation or buried.

The Hinkley Point site demonstrated all the features observed at Lilstock and Stert Point though the markers which moved travelled appreciably further in a given period than those at other sites. This can be explained in terms of the prominent position of Hinkley Point, especially in relation to wave attack from the dominant direction which is here slightly north of west. To the east lies a long stretch of smooth shoreline where the water,

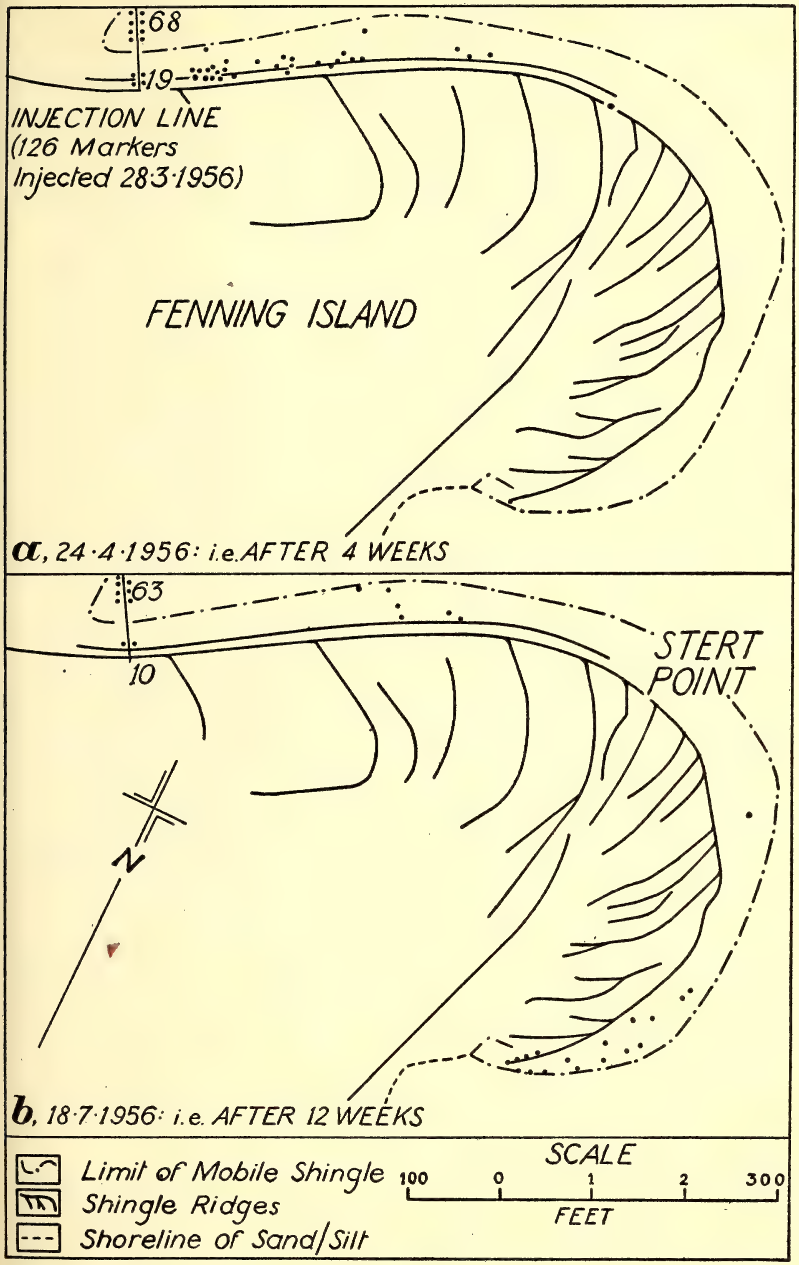

68
19
INJECTION LINE
(126 Markers
Injected 28·3·1956)
FENNING ISLAND
a, 24·4·1956: i.e. AFTER 4 WEEKS
63
10
STERT
POINT
N
b, 18·7·1956: i.e. AFTER 12 WEEKS
Limit of Mobile Shingle
Shingle Ridges
Shoreline of Sand/Silt
SCALE
100
0
1
2
300
FEET

Fig. 4. Stert Point: distribution of markers.

at high tide, is still sufficiently deep to allow the waves to retain much of their energy and thus to transport shingle more rapidly. East of Stolford, the attenuation of wave energy through shallowing becomes progressively greater until the estuary is reached. One feature distinguishes Hinkley Point from all the other sites. This is the very pronounced nature of the western element in shingle movement which reached a maximum of more than 1,700 feet as shown in Table II.

TABLE II. MOVEMENT AT HINKLEY POINT (HIGH TIDE ZONE MARKERS)

Plot No. and Date	Movement (in feet)			
	Westerly		Easterly	
	Mean	Max.	Mean	Max.
2. 23rd March 1955 . .	1141	1746	1413†	4385†
7. 12th July 1955	561	1051	1997	4833
12. 13th Nov. 1955	—	1284*	2485	7140
16. 27th March 1956	—	750*	3509†	6756†
19. 19th Dec. 1956	—	0	2399	5873‡
- 15th March 1961	—	—	3294	5914

† Evidence of westerly drift immediately before search.
* 1 residual marker only.
‡ Between Plots 16 and 19, building operations for Somerset River Board sea wall at Hinkley Point destroyed the injection site. Reduction of maximum and mean travel reflect burial of furthest travelled markers rather than any continuation of westerly drift.

This movement followed a period of storms from the north-east after the experiment had been under way for two months. Although this travel towards the west had been cancelled out by the end of the experiment, it did serve to show a feature which is characteristic of beaches everywhere and which in some places is of vital significance. Beach material does not move alongshore in one direction only. It can and does move back and forth in response to changes in the angle of wave approach.

After the experiment had been under way in this site for a little over 15 months, a good deal of the shingle at the top of the beach was incorporated in a sea wall built by the Somerset River Board in an attempt to stop the erosion of Hinkley Point. Since the High Tide zone close to the injection line had already been swept clear of markers, the results of this building were negligible. Only the few markers which had been thrown on to the top of the beach ridge became involved in the operation. At a later date a start was made on the much larger sea wall for the new Nuclear Power Station at Hinkley Point. This wall was sited further seaward than its predecessor because the turbine house has been placed on what was the upper part of the beach. This so changed conditions that the experiment here was not continued after the initial two year period but a recent search has indicated that the trends of the first two years have been continued. It is noteworthy that the experimental data were used by the Consulting Engineer for the construction of the Nuclear Power Station sea wall and were responsible in some measure for facilitating its design and erection. Elsewhere on this coast other human interference included normal coast defence operations such as the use of draglines for repairing gaps in the shingle ridge, where this formed a major element in the sea defences, and the construction of groynes. Fortunately none of this work, which must be regarded almost as a beach process in itself, came sufficiently early in the experiments to be a major influence.

Both the sites in the zone of the shingle complexes, Stolford and Wall Common, show a similar pattern of movement to those further west. This is demonstrated for Wall Common in Fig. 5.

However, the most striking feature of the experimental results in these two sites was the differential movement of different sizes of markers. Fig. 6 shows the position at Stolford in the early stages of the experiment. The mean position of size 2 markers indicates much greater travel compared with that of size 3 markers for the same dates.

TABLE III. DIFFERENTIAL MOVEMENT OF SIZE 2 AND SIZE 3 MARKERS AT WALL COMMON

Plot No.	Arithmetical mean of the Easterly travel of markers in feet.	
	Size 2	Size 3
1 (3 weeks)	394	83
2	296	157
3	443	236
4	489	369
5 (9 weeks)	478	339
6	513	306
7	460	320
8	551	400
9 (20 weeks)	673	419
10	747	521

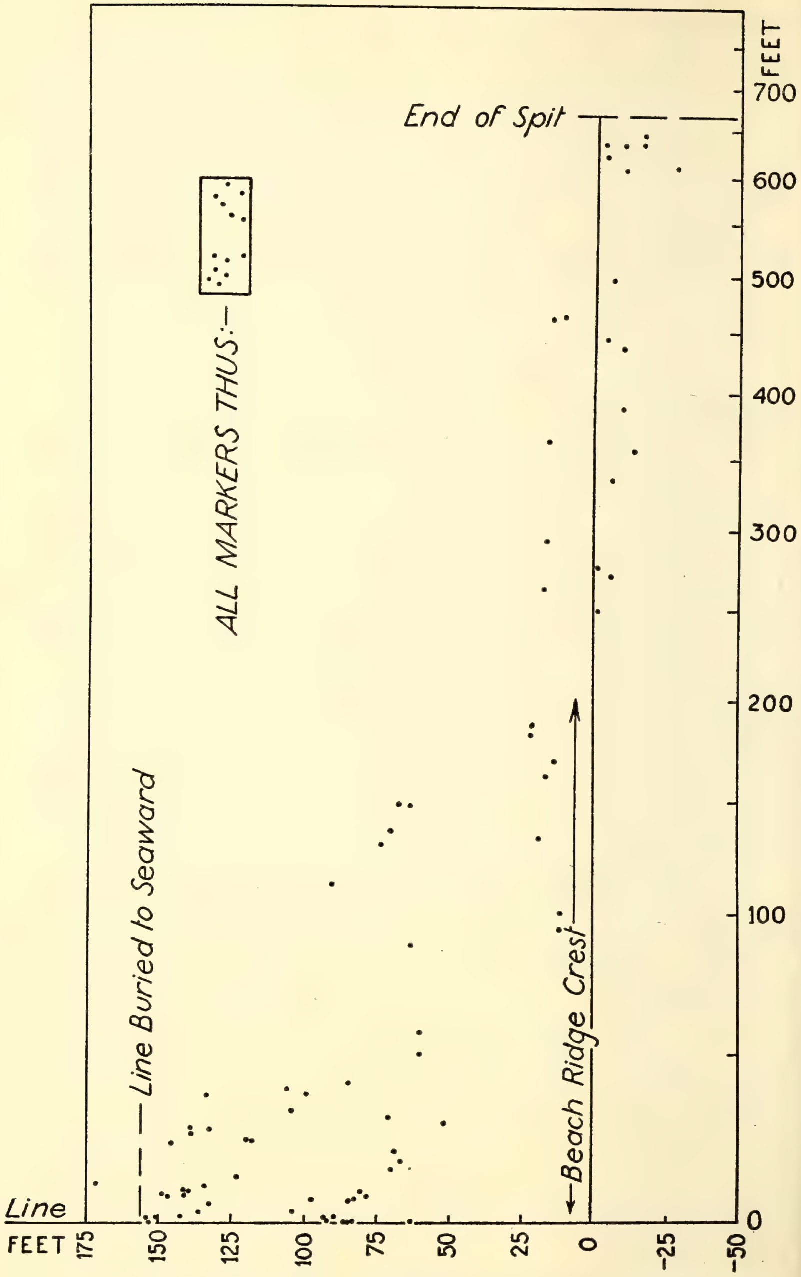


FIG. 5. Wall Common: distribution of markers after two years.

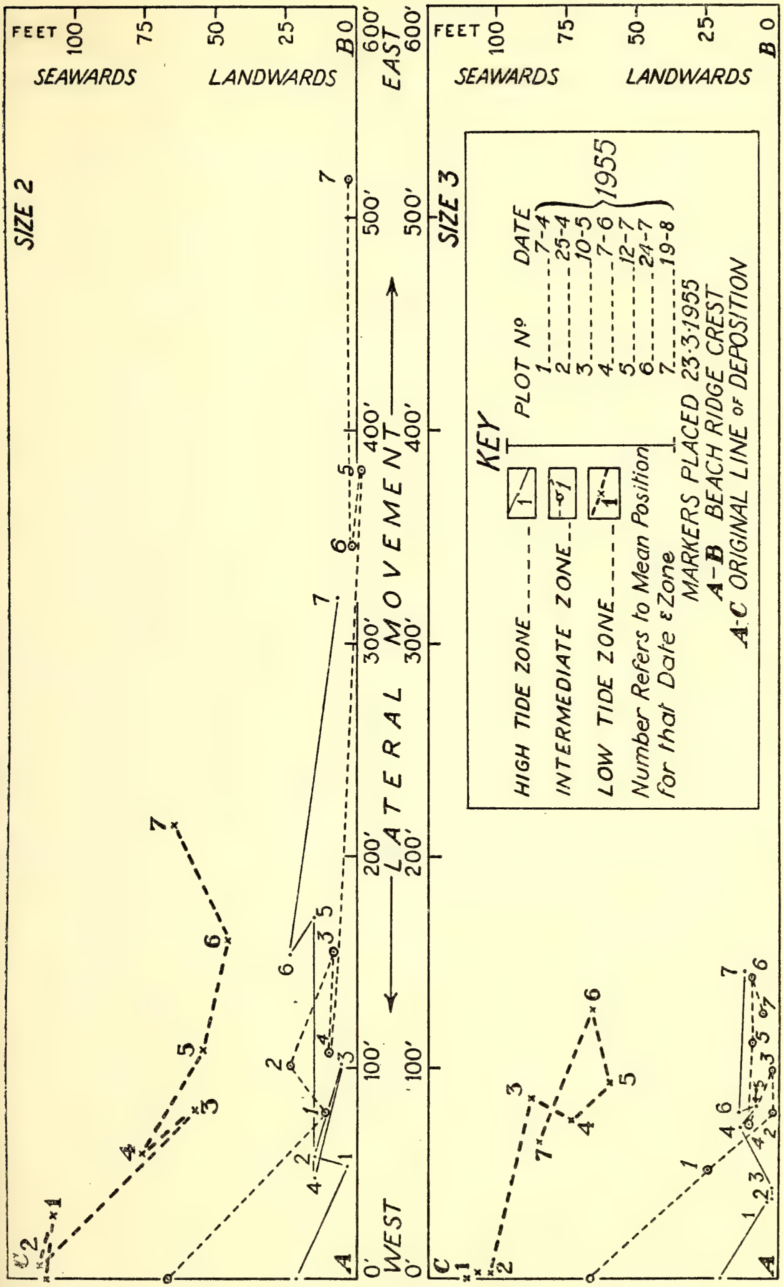


Fig. 6. Stolford Experiment: analysis of differential movement.

Table III depicts the same feature at Wall Common. Fig. 6 indicates also that on some occasions the mean position of one size of marker may move in an opposite direction to the mean position of a different size between any one search and the next. This is especially well shown in plots 6 and 7, where appreciable travel has occurred to the east in the size 2 markers, while movement of the size 3 markers is much smaller. The mean position of size 3 material, from two of the original zones, has in fact progressed towards the west. This is a genuine change and not the result of burial of far travelled markers (*cf.* footnote to Table II).

Differential movement has been recorded elsewhere. Steers (1948), for example, noted it between sand and shingle at Blakeney Point, Norfolk. He argued that the shingle was affected by waves from the north-east, the sand by currents from the opposite direction. Arkell (1947) quotes N. M. Richardson (1902) and Vaughan Cornish (1898). Richardson thought that individual pebbles on Chesil Bank travelled until such time as their size grading conformed to that of the remainder of the beach material. Cornish observed that there were two sets of waves of very different intensities and directions operating on the beach at Chesil. He believed that these together were responsible for the well-known grading by moving large and small material differentially. Currents, used in the sense of tidal streams, are clearly not relevant at Bridgwater Bay in view of the large size of beach material. Wave direction and wave form just as certainly are the important factors. Because of the very special hydraulic conditions on this coast, differential movement has not resulted in a very marked degree of grading. The shingle is disposed in structures which tend to be separate one from another in response to these hydraulic conditions. Even within a single structure only partial grading is to be observed (Plate III).

This differential movement of shingle dependent on size and position on the beach runs completely counter to the basic assumptions made by Reid and Jolliffe (1961). In a paper on shingle movement on certain South Coast beaches, they assume that the rate of movement of all material, irrespective of size, position on the beach or the depth of burial, within specified limits, is uniform. Uniformity of movement is, however, demonstrably not the general rule since the experiments at Bridgwater Bay have shown the opposite to be true. That this is not a freak result in response to purely local conditions is demonstrated by the Orfordness experiments (Kidson, Carr and Smith, 1958). Here a considerable proportion of the marked shingle found was again thrown to the top of the beach under storm conditions and remained there throughout the period of the experiment. Meanwhile other marked material moved as much as 1¼ miles to the north and subsequently over ½ mile to the south. Reid and Jolliffe also assume that the net drift pattern between any two injections of marked material, in their case a week, is the same as the general pattern over a whole year, and that movement of material is constant and in one direction only. Yet counter drift was a marked feature in both the Bridgwater Bay and the Orfordness experiments, carried out in widely contrasting situations and where one direction of movement would appear to be dominant.

CONCLUSIONS

The most obvious conclusion from the Bridgwater Bay drift experiments is that the progression of beach material alongshore is extremely slow. Even six years after the marked material was laid down on the beach the furthest travelled marker from Lilstock Harbour was found only 7,500 feet from its point of origin. At Hinkley Point, where movement was more rapid than at any other site, the furthest travelled marker averaged only 80 feet per month. In the early stages of the experiments the maximum travel was of the order of 2,000 feet a month. The difference between these figures is simply a reflection of the fact that pebbles are unable to move for long periods, when they are buried or cast so high up the beach as to be out of reach of the waves. The leeward movement of the mean of all the markers which travelled at all from the Hinkley Point site average less than 50 feet a month over a six year period. There can be few stretches of coast with such slow-moving beach material.

This coast is unique, not only in respect to slow movement but also in relation to the very narrow belt within which this movement is confined. Only those markers which were laid down close to the high water mark entered into the circulation of beach material. Those further down the beach remained virtually static.

The dominant direction of movement in the experimental area is from west to east though travel in the opposite direction does occur from time to time, as the results for Hinkley Point especially demonstrate.

Perhaps the most striking feature which has resulted from these experiments is the differential nature of shingle movement which has been considered at some length above. Larger shingle quite clearly moves at a different speed and sometimes even in a different direction from smaller pebbles. This selective treatment of beach material by the waves produces almost perfect grading in coastal sites such as Chesil Bank. Similar grading does not take place along this coast because movement of individual pebbles tends to be confined to the limits of a single structure. On only a very few occasions, even over a period of as long as six years were markers observed to travel beyond these limits. The larger material travels relatively quickly towards the end of the beach ridge or shingle complex of which it is part. There, it is held up and the more slowly travelling smaller material begins to overhaul it. Only partial grading can take place under these circumstances.

This part of Bridgwater Bay is as unique physiographically as it is in many other respects. The results of the drift experiments described above show features which could not be reproduced on other stretches of coast, yet some of the lessons are of universal application. The movements of beach material are as variable as the waves which induce them.

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ASSISTED BY A COMMITTEE

"Rerum cognoscere causas"—Virgil

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VOLUME XXX, PART IIIB, 1961

CONTENTS

	PAGE
Council	216
Members at May 31, 1962	217
Report of Council	231
Report of Entomological Section	231
Hon. Treasurer's Statement of Accounts	232
Report of Botanical Section	233
Report of Geological Section	234
Report of Ornithological Section	235
Report of Junior Section	236
Account of the General Meetings	237
Hon. Librarian's Report	238
Bristol Botany in 1961, by N. Y. Sandwith	239
Bristol Bird Report, 1961	245
Lepidoptera Notes, Bristol District, 1961, by C. S. H. Blathwayt	271
A Note on Coastal Experiments with Fluorescent Tracers, by W. J. Reid and I. P. Jolliffe	273
Rhaetic Exposure at Emborough, by R. J. G. Savage	275
Some Notes on the Rhaetic Sediments of the Filton By-Pass Substitute, near Bristol, by D. Hamilton	279

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	Weir, Mrs. A. M.	Hursley Hill, Whitchurch, Bristol
C.	*Welch, Dr. F. B. A., B.Sc., Ph.D., F.G.S.	H.M. Geological Survey and Museum, South Kensington, London, S.W.7
A.	Welch, M. J.	44 Conygre Road, Filton, Bristol
	Welshman, Miss M. J.	2 Kings Road, Brislington, Bristol, 4
	West, Miss N. L.	18 Dennyview Road, Abbots Leigh, nr. Bristol
	Westcott, Miss M. V., M.Sc.	20 Linden Road, Redland, Bristol, 6
	Whistler, L. D.	8 Dundonald Road, Redland, Bristol, 6
	White, D. S., B.Sc.	44 The Park, Kingswood, Bristol
	Whiting, Dr. H. P., D.S.C., M.A., Ph.D.	62 Woodstock Road, Redland, Bristol, 6
	*Whittard, Prof. W. F., D.Sc., Ph.D., F.R.S.	Dept. of Geology, University of Bristol, Bristol, 8
	Williams, Mrs. G. E.	Pineheath, de Maulley Road, Bournemouth
	Williams, T. R. J., M.Sc., A.R.I.C.	24 Orchard Road, Nailsea, nr. Bristol
	Williams, Mrs. T. R. J.	Do.
	*Willis, Dr. A. J., B.Sc., Ph.D., F.L.S.	Dept. of Botany, University of Bristol, Bristol, 8
	Wills, R. F.	40 Claremont Road, Bishopston, Bristol, 7
	Wills, Mrs. R. F.	Do.

Wilmott, H. A., B.Sc., A.M.I.C.E.	17 Salisbury Road, Redland, Bristol, 6
Wilmott, Mrs. H. A.	Do.
Winchester, Miss D. E.	8 Richmond Hill, Clifton, Bristol, 8
Withers, Miss D.	104 Wells Road, Bath, Somerset
H. *Womersley, H., F.R.E.S., A.L.S.	South Australian Museum, North Terrace, Adelaide, South Australia
Woodland, P., M.A.	Dursley Grammar School, Dursley, Glos.
Wright, M.A.	28 Glebe Road, Long Ashton, Bristol
Yemm, Prof. E. W., B.A., D.Phil., F.L.S.	Stoneleigh, Long Ashton, Bristol
Yemm, Mrs. E. W., B.A.	Do.
H. *Yonge, Prof. C. M., C.B.E., Ph.D., D.Sc., F.R.S., F.R.S.E.	Dept. of Zoology, The University, Glasgow
Young, K. B.	12 Clifford Gardens, Shirehampton, Bristol
Young, Mrs. K. B.	Do.
Zunz, Miss D., S.R.N., S.C.M.	39 Henley Grove, Henleaze, Bristol

AFFILIATED SOCIETIES

BATH—

Bath Natural History Society (Hon. Secretary, F. R. Sterne), 9 Charlcombe Way, Bath, Somerset

City of Bath Training College, Newton Park, Newton St. Loe, nr. Bath, Somerset

BRISTOL—

Bedminster Down Secondary School, Donald Road, Bristol, 3

Bristol, Clifton and West of England Zoological Society, Clifton, Bristol, 8

Bristol Grammar School Field Club, Elton Road, Bristol, 8

British Broadcasting Corporation (Natural History Unit), Broadcasting House, Whiteladies Road, Bristol, 8

Clifton High School Field Club, College Road, Bristol, 8

College of St. Matthias, Fishponds, Bristol

Duncan House School Scientific Society, The Promenade, Clifton, Bristol, 8

Portway Secondary Boys' School Field Club, Shirehampton, Bristol

Queen Elizabeth's Hospital Natural History Society, Berkeley Place, Clifton, Bristol, 8

Red Maids Scientific Society, Westbury-on-Trym, Bristol

Redland High School for Girls Field Club, Redland Court, Bristol, 6

Trafalgar Social Club, Imperial Chemical Industries Ltd., 35 Queen Square, Bristol, 1

University of Bristol Horticultural Science Laboratories, Bracken Hill, Leigh Woods, Bristol, 8

University of Bristol Geological Society, Queen's Building, University Walk, Bristol, 8

University of Bristol Zoological and Botanical Societies, The University, Bristol, 8

DURSLEY—

Dursley & District Bird Watching and Preservation Society (Hon. Secretary, T. P. Walsh), 76 Kingshill Road, Dursley, Glos.

Dursley Grammar School Natural History Society, Dursley, Glos.

KINGSWOOD—

Kingswood Grammar School Natural History Society, Hanham Road, Kingswood, nr. Bristol

LEYHILL—

Birdwatching Group, H.M. Prison, Leyhill, nr. Falfield, Glos.

REPORT OF COUNCIL
1961

THE membership is now 641, including a Junior Section of 89. There are 20 affiliated societies.

At the Annual General Meeting the Officers and Members of Council were elected with Dr. F. Coles Phillips as President. The usual General and Sectional meetings were held and the Field meetings continue to provide a popular and varied programme. A sub-committee has been very busy making arrangements for the Centenary, including the Dinner on May 8, and an exhibition in early June. The Annual Dinner was held on March 17, in the Senior Common Room of the University, once again lent by courtesy of its members. Our guest speaker was Mr. I. G. Mathers who showed us his colour film, the first ever taken, of the Cameroons. It was a very successful evening; 110 people were present.

The deaths during the year of Mr. E. H. Day, Miss A. C. Favell, Mr. C. R. Hobbs, Mrs. A. Marsden, Mr. E. E. Owen and Miss A. E. Taylor are recorded with much regret.

A. C. LEACH, *Hon. Secretary.*

REPORT OF ENTOMOLOGICAL SECTION
1961

AT the Annual General Meeting, held on January 3, 1961, Mr. Norman A. Watkins was re-elected President and Mr. M. Ackland Secretary. In June Mr. Ackland resigned as he was leaving Bristol and Miss B. E. Jones and Dr. D. A. Stopher acted as joint secretaries for the rest of the year. There were three indoor meetings during the year as follows:

Mar. 7: Fossil Insects. Dr. R. J. G. Savage.
Oct. 3: Films—*Monarch Butterfly, Alder Wood Wasp.*
Nov. 7: Annual Exhibition.

On Sunday, June 4, the Section held a Field Meeting in the Mendips at Burrington Combe.

D. A. STOPHER, *Hon. Secretary.*

The Hon. Treasurer in Account with the Bristol Naturalists' Society

Dr. RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31 DECEMBER, 1961. *Cr.*

1960. £ s. d.			£ s. d.	£ s. d.	£ s. d.
	To Members' Subscriptions :—				
497 12 0	,, Full Members	1960 ..	6 17 6		
		1961 ..	486 18 6		
		1962 ..	21 5 0	515 1 0	
51 13 9	,, Full Members of the same household	1960 ..	1 17 6		
		1961 ..	54 13 9		
		1962 ..	2 10 0	59 1 3	
12 5 1	,, Corresponding Members	1961 ..	11 4 11		
		1962 ..	12 6	11 17 5	
9 12 6	,, Associates	1961 ..	8 10 0		
		1962 ..	1 10 0	10 0 0	
25 0 0	,, Juniors	1961 ..	20 5 0		
		1962 ..	5 0	20 10 0	
32 0 0	,, Affiliated Societies	1961 ..	29 0 0	29 0 0	
628 3 4					645 9 8
– – –	,, Donations				2 2 0
	,, *Proceedings* (1959) :				
	Subscribers			2 16 0	
	,, *Proceedings* (1960) :				
	Authors			10 0 0	
	Separates			22 6 4	
	Subscribers			2 0 0	
	,, Sales of Publications			1 0 0	
37 3 11					38 2 4
665 7 3					685 14 0
3 1 5	,, Field Committee : surplus over expenses				13 16 5
61 12 2	,, Profit on film				– – –
– – –	,, Profit on dinner				2 19 3
4 15 8	,, Interest on deposit in Post Office Savings Bank				2 16 0
7 17 6	,, Interest on £200 5% Defence Bonds				10 0 0
742 14 0					715 5 8
362 10 7	,, Balances from last account ..				438 15 0
£1,105 4 7					£1,154 0 8

1960 £ s. d.			£ s. d.	£ s. d.
80 11 10	By General printing and stationery, including Rules		123 12 2	
75 7 11	,, Postages and Telephone		84 18 0	
16 0	,, Cheque Books		12 0	
6 0 0	,, Clerical Assistance		11 0 0	
162 15 9				220 2 2
273 17 6	,, *Proceedings* (1960, including separates)			324 3 3
13 12 0	,, Books		– – –	
86 6 0	,, Bookbinding		– – –	
18 15 6	,, Periodicals		21 5 6	
1 0	,, Rent (for Library Room)		1 0	
7 18 4	,, Fire Insurance (Library)		3 19 2	
– – –	,, Transport of Books to Queen's Building ..		2 6 8	
				27 12 4
	,, Subscriptions :			
1 5 0	Council for Nature, etc.		2 10 0	
3 9 0	South Western Naturalists' Union ..		3 8 0	
13 10 0	Steep Holm Trust		9 0 0	
				14 18 0
7 8 0	,, Fares and Expenses of General Meetings			6 0 0
1 9 0	,, Loss on Dinner			– – –
75 0 0	,, Grants to Sections :			
	Botanical		15 0 0	
	Entomological		16 4 2	
	Geological		15 0 0	
	Ornithological		25 0 0	
	Junior		10 0 0	
				81 4 2
1 2 6	,, Window Display			– – –
– – –	,, Deposit on hire of Hall for 1962			11 16 3
666 9 7				685 16 2
	,, Balances to next Account :			
	Cash at Bank	110 6 11		
	Less unpresented cheque	9 0 0		
88 9 10			101 6 11	
112 16 9	*Deposit in Post Office Savings Bank ..		115 12 9	
200 0 0	£200 5% Defence Bonds		200 0 0	
37 8 5	In hands of Field Committee		51 4 10	
				468 4
	*Including Centenary Reserve £88.16s. 6d.			
£1,105 4 7				£1,154 0 8

P. J. M. NETHERCOTT, *Hon. Treasurer,*
12 January, 1962.

Audited and found correct,
A. E. BILLETT, *Hon Auditor,*
16 January, 1962.

REPORT OF BOTANICAL SECTION
1961

AT the Annual Business Meeting held in the Physiology Lecture Theatre of the University on January 9, 1961, the following officers were elected: President, Mr. I. W. Evans; Secretary and Treasurer, Miss I. F. Gravestock; Committee: Mrs. G. S. Wakefield, Miss A. M. Sampson, Mrs. D. E. Bunce, Dr. A. F. Devonshire, Mr. F. W. Evens, Mr. J. A. Eatough, Mr. H. F. Howard and Mr. R. F. Wills.

The Wild Plant table at the Bristol Museum has been much appreciated during the year and sincere thanks are offered to Mr. A. Warhurst and Mr. P. F. Bird of the Museum and to Mr. I. W. Evans, Mrs. G. S. Wakefield and Mrs. C. H. Cummins, as well as to all members who have contributed specimens.

During the year the following Winter meetings were held:

Jan. 9: Flowers of the Coast, by Mr. Ian Hepburn, M.A., followed by the Annual Business Meeting.
Feb. 13: The Importance of Soil in Plant Ecology, by Mr. R. L. Jefferies, B.Sc.
Mar. 13: Hormones and Plant Growth, by Professor E. W. Yemm.
Oct. 9: Short papers and transparencies by members of the Section.
Nov. 13: The British Flora in Perspective, by Professor T. G. Tutin.
Dec. 11: Mosses and Vegetation, by Dr. M. C. F. Proctor.

The following field excursions took place under the leadership of those shown:

Apr. 25: Stokeleigh Forest. Miss C. Groves.
May 12: Nailsea Moor. Mrs. D. E. Bunce.
May 27: Wayford Manor. Mr. C. H. Cummins.
May 31: Bourton Combe. Miss A. M. Sampson.
June 17: Cadbury Camp. Mr. P. J. M. Nethercott.
June 25: Kenfig Burrows. Mr. I. W. Evans and Mr. J. A. Eatough.
July 8: Wotton-under-Edge. Dr. A. F. Devonshire.
July 25: Hanham and Troopers' Hill. Mr. I. W. Evans.
Aug. 14: Hursley Hill to Keynsham. Mr. I. W. Evans.
Aug. 21: Clevedon Salt-marsh. Mr. I. W. Evans.

I. F. GRAVESTOCK, *Hon. Secretary.*

REPORT OF GEOLOGICAL SECTION
1961

At the Annual Business Meeting held in the Geology Department of the University on January 11, 1962, the following officers were elected:—President, Dr. J. W. Cowie; Vice-President, Mr. C. E. Leese; Hon. Secretary, Mr. R. G. Payne; Field Secretary, Mr. A. C. K. Fear; *Ex-officio*, Professor W. F. Whittard and President of Students' Geological Society; Committee, Mr. R. Bradshaw, Mr. V. D. Dennison, Mr. T. R. Fry, Dr. F. C. Phillips, Dr. R. J. G. Savage, Mr. W. Stock, Mr. D. Vowles, Mr. H. A. Wilmott.

During 1961 the Committee met twice, on January 12 to make proposals for officers, and on January 26 to arrange Summer and Winter programmes. The Annual General Meeting was held on January 12, when reports were read and officers elected. Films were shown at the conclusion of the Annual General Meeting.

There were four lecture meetings of the Section during the year:—

Feb. 2: Dr. J. W. Cowie—Geological Exploration in the Arctic.
Mar. 9: Dr. A. J. Willis—Pollen and Peat Deposits.
Oct. 26: Dr. F. C. Phillips—Crystal Patterns.
Nov. 30: Mr. R. Bradshaw—Leonardo da Vinci: Geologist.

There were six Field Meetings during the Summer as follows:—

May 3: Building Stones of Bristol; leaders Mr. I. H. Ford and Mr. E. W. Seavill.
May 27: Shirehampton; leader Mr. S. C. Matthews.
June 17: Lulworth Cove and Durdle Door; Mr. J. Cope.
July 1: Oxford; Dr. W. S. McKerrow.
Aug. 12: Aust; Mr. F. S. Ross.
Sept. 23: Winford; Mr. V. D. Dennison.

From Sept. 29 to Oct. 2, Messrs. Ross, Vernon and Payne led a party from the Geological Section, Croydon Naturalists' Society, to various geological sites in the district.

All lectures were held in the Geology Department of the University, and the Section would like to record its thanks to Professor Whittard and its indebtedness to the University for making the premises freely available for these activities.

R. G. PAYNE, *Hon. Secretary.*

REPORT OF ORNITHOLOGICAL SECTION

1961

"THE WREN THE WREN
THE KING OF ALL BIRDS..."

At the 37th Annual Business Meeting in January, Mr. G. Sweet was re-elected President and Mr. S. M. Taylor Hon. Secretary. Mrs. G. Buxton and Messrs. P. J. Chadwick, G. A. Forrest and J. D. R. Vernon were re-elected to the Committee, and Miss R. C. Lee and Messrs. R. M. Curber and R. F. Thearle were elected in place of Miss D. M. Crampton, Mr. G. E. Clothier and Mr. H. H. Davis, who retired by seniority. The Editorial Committee, comprising Messrs. P. J. Chadwick, H. H. Davis, R. H. Poulding and M. A. Wright was re-elected.

During the year the following meetings were held:

Jan. 20: Annual Business Meeting. Waders on the Wash, by Mr. R. Hitchcock.
Feb. 17: Bird Ringing—A Survey, by R. Spencer, Ringing Officer, B.T.O.
Mar. 22: The National Wildfowl Count Scheme, by Mr. G. Atkinson-Willes, Wildfowl Trust.
Oct. 6: Spitzbergen and its Birds, by Mr. R. Gillmor.
Nov. 8: Annual Field Programme Meeting.
Dec. 8: The Language of Birds, by Mr. J. Boswall, B.B.C. Natural History Unit.

Attendance ranged from 45 to 87, averaging 62.

An all-day visit was paid to Steart in February (led by Messrs. D. Cullen and B. King) and a half-day visit to the Wildfowl Trust in April (led by Mr. H. H. Davis).

Two afternoon field walks and one evening walk were held in the Spring, to Blagdon Reservoir, Belmont Hill and Failand, and Saltford. Leaders were: Messrs. G. Sweet, B. King and G. E. Clothier.

Co-operative fieldwork included a fourth year of the breeding-season Shelduck Survey (confined this year to the Somerset part of the coastline), and a repeat of the 1956 survey of the Severn Vale rookeries. Members also took part in the B.T.O.'s Nest Record and Bird Ringing Schemes and Road Deaths Enquiry.

S. M. TAYLOR, *Hon. Secretary.*

REPORT OF JUNIOR SECTION

1961

AT the Annual Business Meeting held on January 27, the following Members' Committee was elected:—Jack Read (Chairman), Richard Ashley (Vice-Chairman), Stephen Locke (Hon. Secretary), Timothy Lait, Elizabeth Bridges, Penelope Welch, John Carey and Keith Fox.

The following indoor meetings were held:—

Jan. 14: New Year Party.
Jan. 27: Annual Business Meeting, followed by Bristol Waterworks film *Blagdon Trout* in preparation for a visit to the Ubley Hatcheries.
Feb. 24: "Bird Navigation". Dr. G. V. T. Matthews, Wildfowl Trust.
Mar. 11: Social evening at the Museum with Mr. Bassindale's Ghana film.
Mar. 24: "The Geology of the Mendip Hills". Mr. R. G. Payne, B.Sc., in preparation for Field meeting on following day.
Oct. 13: "The Severn Estuary". Mr. A. E. Frey, B.A., in preparation for Field meeting to English Stones and Aust.
Oct. 28: Social evening at the Museum. A paper on Insectivorous Plants by Stephen Locke.
Nov. 10: "Rare Flowers of the Bristol District". Dr. A. J. Willis.
Dec. 15: "The History and Practice of Falconry". Mr. Harry Savory.

Field meetings were as follows:—

Jan. 28: Ubley Trout Hatcheries. Mr. Williamson showed the method of trapping fish and fertilising the ova and explained the successive stages until finally the young fish are liberated in the reservoir. Cheddar Reservoir was also visited.
Feb. 18: Chew Valley Reservoir. Leader—Mr. Harry Savory.
Mar. 25: The Geology of Burrington. Leader—Mr. R. G. Payne, B.Sc.
Apr. 6: Brockley Combe area—an entomological meeting. Leader—Mr. M. Ackland.
Apr. 15: Ford to Castle Combe. Leader—Miss A. E. Bennett, B.Sc.
May 14: Burrington to Cheddar. Leaders—Mr. P. F. Bird, B.Sc. and Stephen Locke.
June 4: Abbotsbury Swannery. Mr. Fred Lexster, the Swan herd, gave an excellent half-hour talk, and in ideal weather swans and cygnets in large numbers were watched as well as terns and many passerines. West Bay was visited on the return journey.
July 22: Devizes and Wiltshire Downs. Owing to lack of support, this visit, to have been led by Miss B. Gillam of the Wiltshire Naturalists, was regretfully cancelled.
Aug. 21: Cannington Farm Institute and the Blake Museum. At Cannington the party, conducted by Mr. Ballardie, viewed Poultry, Piggeries, Cattle and the Model Dairy, and finally Mr. Ballardie talked on the history of the buildings.
Sept. 30: Brockley and Goblin Combes. Leaders—Miss C. Groves and Richard Ashley.
Oct. 21: The Severn – English Stones – Aust Cliff. Leader—Mr. H. Neal.
Nov. 18: Cheddar Reservoir. Leaders—Timothy Lait and Mr. H. Savory.
Dec. 10: Blagdon Lake. Leaders—Jack Read and Mr. H. Savory.

DORA WILLS, *Hon. Secretary, Advisory Committee.*
STEPHEN LOCKE, *Hon. Secretary, Members' Committee.*

ACCOUNT OF THE GENERAL MEETINGS 1961

THE 98th Annual General Meeting was held on Thursday, Jan. 19. The Officers and Members of Council were elected, and Dr. F. Coles Phillips was re-elected President. Mr. T. H. Payne was elected an Honorary Member. For his Presidential address Dr. Coles Phillips took the title of "Pattern and Symmetry in Nature". He illustrated his talk with slides, mostly of organic life, models of crystals and other symmetrical objects.

On Feb. 16, Prof. T. F. Hewer showed us his film on "African Game Reserves", together with a few excellent 'stills'. He stressed the danger of the failure of protective measures unless the natives can be brought to see that their prosperity will be enhanced by the survival of the animals. It is hard to single out any from such a fine series of pictures, but perhaps those of Giant Lizards, 5 feet long, eating the eggs of turtles, were the most unusual.

On Oct. 5, Dr. Ernest Neal gave a highly interesting talk on Otters, with slides and a film of his own pet otters, Topsy and Turvy. He told us many interesting and little-known facts about the early life of the otter. Especially interesting was his tape recording of the noises of young otters, including the 'whistle'. He also said that fish were not their favourite food.

On Nov. 9, Mr. Alan Warhurst, Director of the City Museum, came to us for the first time, and told us about some of the recent archæological discoveries in Bristol, illustrating his lecture with slides and with numerous specimens of pottery which helped to date the discoveries. He spoke especially about the bastion of the old city wall behind St. Nicholas' Almshouses. The discoveries dated the walls to 1275 and the Almshouses to 1656.

On Dec. 7, Mr. R. S. George, Secretary of the new Gloucestershire Trust for Nature Conservation, gave a talk under the title "Why Fleas?". He discussed the various kinds of flea and said that they were present on both birds and mammals; the human flea could be picked up from badgers and some other animals. As recently as 1916 plague fleas were found in a rag warehouse in Bristol. In Gloucestershire alone there are 40 different types of flea. Mr. George concluded with some remarks on the progress and importance of the County Trust.

A. CROOME LEACH, *Hon. Secretary.*

GENERAL FIELD MEETINGS

FIFTEEN general field meetings took place during the year and again proved popular, particularly the one to Portland. So many members were unable to obtain seats for it that it has been decided to repeat it next year.

A brief summary of the meetings under the leadership of those named is given below, and a much fuller account is kept in the records of the Field Section.

Jan. 14: Sand Point and Tealham Moor. Mr. H. G. Hockey.
Feb. 11: Kingston Seymour. Mr. H. F. Flook.
Mar. 19: Caerwent and Chepstow. Dr. A. F. Devonshire and Mr. A. C. K. Fear.
Mar. 31: North Hill (Minehead) and Selworthy Beacon. Mr. H. G. Hockey.

Apr. 22: The Chantries and Devizes. Mr. F. R. Sterne.
May 2: Shipham. Mr. T. Silcocks.
May 14: Portland Bill and Bird Observatory. Mr. D. A. C. Cullen and Mr. B. King.
June 10: Tintern, Goodrich Castle and Lower Soudley. Dr. A. F. Devonshire.
June 14: Worlebury Hill and Weston Woods. Mr. H. G. Hockey.
July 15: Old Sarum, Breamore Down, and Britford. Mr. H. F. Flook.
Aug. 19: Limpley Stoke and Bradford-on-Avon. Mr. H. G. Hockey and Mr. I. W. Evans.
Sept. 9: Elan and Claerwen Valleys. Mr. H. G. Hockey.
Oct. 15: Watchet. Mr. A. L. Wedlake and Mr. H. G. Hockey.
Nov. 11: Nature Conservancy, Steart. Miss C. Groves.
Dec. 3: Cardiff Museum. Mr. A. C. K. Fear.

A. F. DEVONSHIRE, *Hon. Field Secretary.*

HON. LIBRARIAN'S REPORT
1961

THE finances of the Library are now on a sound footing following the acceptance by Council of a proposal to spend a fixed proportion of the Society's income on (1) binding, (2) the purchase of books, and (3) subscriptions to journals not received on exchange.

The binding of periodicals received has for a long time been causing disquiet and it has now been decided to bind only the British national journals and a limited number of those of local Natural History societies. The unbound periodicals will be stored in boxes.

A number of minute books dealing with the early years of the Society were discovered towards the end of the year and these were of some help to Dr. F. C. Phillips in his writing of the history of the Society.

215 volumes were borrowed by 51 members during the year.

R. BRADSHAW, *Hon. Librarian.*

OBITUARY

J. H. SAVORY

AS this issue goes to press we learn with deep regret of the death, on June 25, of Mr. Harry Savory. Full tribute to his work as a naturalist and his many services to this Society will be published in the *Proceedings* for 1962. Meanwhile we extend our sincere sympathy to Mrs. Savory and other members of the family.

BRISTOL BOTANY IN 1961

By N. Y. Sandwith

1961 was notable for a very mild February and March, but later was not distinguished by either good weather or sensational botanical discoveries. July and August, indeed, were wet and chilly. September and October were much better months, but the year ended with an unusually cold Christmas season.

On September 11th the Nature Conservancy announced that 484 acres of peat moor and scrub woodland at Shapwick Heath, N. Somerset, were to form a new nature reserve, access to which is to be by permit only. The land lies between the roads leading from Shapwick and Ashcott railway stations to the Polden Hills; it consists mainly of carr which is almost impenetrable in places. In the last few years there has also been a revival of interest in the "Sharpham Plot": many references to this Plot will be found in the introductory or closing comment in the Reports of the Botanical Section (now the Natural History Section) of the Somersetshire Archæological and Natural History Society for the years 1923–1934.

The three principal contributors to the following notes are abbreviated as follows:—I.W.E., I. W. Evans; D.M.S., Dr. D. Munro-Smith; A.J.W., Dr. A. J. Willis. Records without indication of the finder are my own.

Ranunculus acris L. A form with the petals white on the upper surface, but of the normal shining yellow colour on the back, was found at Downend, **G.**, by *D.M.S.*

R. peltatus Schrank. Pond, Winterbourne, **G.**, *D.M.S.*

Rorippa microphylla (Boenn.) Hyland. Small pond near Thornbury railway station, **G.**, *Dr. R. W. G. Dennis.*

Sisymbrium officinale (L.) Scop. var. *leiocarpum* DC. On an old tip, Rodway Hill, Mangotsfield, **G.**, *D.M.S.*, det. *A.J.W.*

Raphanus Raphanistrum L. Dr. Munro-Smith has studied the colour-forms of this species in the neighbourhood of Downend, **G.** He found that by far the greatest number of plants have white petals, some with dark veins, but quite as many without them. The next commonest form has very pale yellow petals, these nearly always with dark purplish veins. In some specimens the petals are a much deeper yellow, always without dark veins: these occurred especially on Rodway Hill.

Finally, there was a very uncommon form (3 plants only) with deep lilac petals with dark veins, perhaps the var. *violaceus* Woerlein. Those who enjoy juggling with the Code of International Rules of Botanical Nomenclature, and wading through the floras, both general and local, of the continental countries, might do worse than take up the task of finding the earliest correct epithets for our colour-forms of the Wild Radish.

R. maritimus Sm. Seaward mobile dunes, Berrow, **S.**, *A.J.W.*

Tilia cordata Mill. Glen Frome, Stapleton, **G.**, *T. B. Fletcher* in *Fl. Glos.*, p. 102, and still there (a large tree, blown down), *D.M.S.*

Lathyrus latifolius L. Weston Woods, **S.**, near the main path to the old pier, *I.W.E.*

L. Nissolia L. Bury Hill, Winterbourne, **G.**, *D.M.S.*

Rosa stylosa Desv. var. *systyla* (Bast.) Baker. Lyde Green, **G.**, *D.M.S.*, det. *R. Melville.*

R. canina L. × *tomentosa* L. Downend, **G.**, *D.M.S.*, det. *R. Melville,* who writes, "A very interesting plant. We have nothing to match it exactly in the [Kew] Herbarium."

Pyrus communis L. Near Hunter's Lodge, near Falfield, **G.**, *Dr. M. L. K. Curtis.*

Callitriche intermedia Hoffm. By R. Frome, Downend, **G.**, *D.M.S.*, det. *J. P. Savidge.* A form growing on mud, with shortly stalked fruits, but not the var. *pedunculata.*

Epilobium adenocaulon Hausskn. × *montanum* L. By path below Proctor's Fountain, Clifton Down, **G.**

E. adenocaulon Hausskn. × *obscurum* Schreb. and *E. adenocaulon* × *parviflorum* Schreb. occurred in a dyke on Walton-in-Gordano moor, **S.** The first of these has not previously been recorded from our district.

E. obscurum Schreb. × *parviflorum* Schreb. Dyke on Walton-in-Gordano moor, and on Shapwick Heath, **S.**

E. Lamyi F. Schultz. In two localities on the outskirts of Wells, and on a level crossing at Radstock, **S.**; *T. D. Pennington,* who has made a special study of British Willowherbs and confirmed the identification of my hybrids. *E. Lamyi*, according to at least one contemporary authority, is best treated as a subspecies of *E. adnatum* Griseb.

Galium capsiriense Jeanb. ex Timb.-Lagr. (*G. erectum* Huds., auct.). Wayside bank, Winterbourne, **G.**, *D.M.S.*

Crepis biennis L. Roadside, Queen Charlton, **S.**, *I.W.E.*

Hieracium eboracense Pugsl. (*H. tridentatum* of *White, Fl.*). Rodway Hill, Mangotsfield, **G.**, *D.M.S.*, det. *P. D. Sell.*

H. brunneocroceum Pugsl. Quarry, Moorend, **G.**, *D.M.S.*, and known there to a quarryman for several years.

Anagallis arvensis L. A form with pale lilac flowers with dark centres, var. *lilacina* Alefeld?, occurred on waste ground at Mangotsfield, **G.**, *D.M.S.* The common colour-form, var. *arvensis*, was growing near by.

Vinca major L. A large patch on sand-dunes north of Berrow church, **S.**, *I.W.E.*

Orobanche minor Sutton var. *flava* Regel (var. *concolor* (Duby) G. Beck). Field border east of Black Rock Quarries, Walton-in-Gordano, **S.**, *S. Clay.* A small specimen, identified by *C. C. Townsend.* The entire plant was a pale citron-yellow, and the stigmas were yellow. New to the district.

Quercus Cerris L. Border of woodland above R. Avon west of Keynsham, opposite Hanham Ferry, **S.**

Alisma lanceolatum With. Rhine, Kingston Seymour, **S.**

Butomus umbellatus L. Feeder Canal, Bristol, **G.**, with *Acorus Calamus* L. (see "Bristol Botany in 1957"), *Parapholis strigosa* (Dumort.) C. E. Hubbard and *Scirpus lacustris* L., *I.W.E.*

Carex strigosa Huds. Oldbury Court Woods, Stapleton, **G.**, *D.M.S.*

Vulpia ambigua (Le Gall) More. The distribution on the Berrow dunes of this small annual grass, first recorded (*C.I.S.* and *N.Y.S.*) for Somerset in these notes last year, has been investigated. *V. ambigua* is most plentiful at the edges of some of the golf greens, where it is sometimes a local dominant. However, it also occurs in a number of sites well away from the greens, and in areas of very open vegetation on loose sand, growing with *V. membranacea.* It is of note that the awns of the Berrow plants are rather long (up to *c.* 13 mm.), and that the anthers of plants flowering in the second week of May 1961 were, on average, rather more than 1 mm. long, with some up to 1.5 mm. Flowers formed later in the season, however, have shorter anthers. The facts that the plant is now known to extend for at least 1½ miles along the dune system and to grow alongside relatively inaccessible thickets of *Hippophaë rhamnoides* suggest that it is not a recent introduction; its present increase may in part be associated with the reduction of the rabbit population, to which the marked spread in the last few years of *Vulpia membranacea* on Braunton Burrows (N. Devon) is probably attributable, *A.J.W.*

Bromus erectus Huds. Berrow sand-dunes, **S.**

Equisetum fluviatile L. Swampy ground near R. Avon below Warleigh Woods, Bath, **S.**

Chara vulgaris L. var. *refracta* Kütz. Dyke on Kenn Moor, **S.**, Oct. 1953, *C. I. Sandwith*, det. *G. O. Allen.*

ALIENS. At Avonmouth Dock, **G.**, the attractive Mediterranean Crucifer, *Carrichtera annua* (L.) DC., was a first record for Bristol. Other casuals of interest there were *Camelina microcarpa* Andrz. ex DC., *Epilobium Lamyi* F. Schultz, *Apium leptophyllum* (Pers.) F. Müll. ex Bth., *Legousia hybrida* (L). Delarb. and *Hordeum jubatum* L. But the most striking feature was a large crop of the genus *Amaranthus* which almost rivalled that of 1959. The most abundant species was *A. Palmeri* S. Wats., of which there were many fine plants of both sexes. *A. tamariscinus* Nutt. (♂) and *A. Watsonii* Standl. (♂ and ♀) were present in small quantity. *A. deflexus* L., *A. graecizans* L. subsp. *graecizans*, *A. albus* L., *A. hybridus* L. subsp. *hybridus* and subsp. *incurvatus* (Timeroy ex G. et G.) Brenan var. *cruentus* Mansf., and *A. retroflexus* L., were also gathered. Students are referred to that excellent paper, "*Amaranthus* in Britain", by J. P. M. Brenan, in *Watsonia*, 4(6), 261–280 (1961).

Other alien records, mostly from outside the Port of Bristol area, are as follows:

Erucastrum gallicum (Willd.) O. E. Schulz. Waste tip, Filton, **G.**, *I.W.E.*, det. *A.J.W.*

Rapistrum rugosum (L.) All. Golf course, Worlebury, **S.**, *I.W.E.*

Geranium Endressii Gay. Hedgebank, Frog Lane, Coalpit Heath, **G.**, *D.M.S.*

Impatiens parviflora L. and *Galega officinalis* L., on a tip at Frenchay, **G.**, *D.M.S.*

Lathyrus odoratus L. Tip at Winterbourne, **G.**, *D.M.S.*

Lythrum junceum Sibth. et Sm. Waste ground near the Bus Terminus, Bristol, **G.**, *Miss A. K. Swaine.* This species has occurred frequently in the Port area, recorded under the names *L. meonanthum* Link or *L. Graefferi* Ten., but had not, I think, been noted for some years.

Artemisia biennis Willd. Bank of the Chew Valley Reservoir, **S.**, *I. I. Jeffries*, det. *R. D. Meikle* at Kew.

Crepis setosa Haller fil. Appeared as a garden weed at Downend, **G.**, *D.M.S.*

C. foetida L. subsp. *rhoeadifolia* (Bieb.) Schinz et Keller. The plant recorded as *C. foetida* from a "tip on the Somerset side of the City" (the former Ashton Gate tip), in "Bristol Botany in 1939", is to be referred to this subspecies, fide *J. B. Marshall.* It is a native of Central and Eastern Europe and the Orient.

Buddleja Davidii Franch. Wood-border, Walton-in-Gordano moor, **S.**

Nymphoides peltata (S. G. Gmel.) Kze. Roadside pond, Winterbourne, **G.**, *D.M.S.* A single plant was observed, presumably an aquarist's "throw-out". There is a very old record from Kingsweston, quoted from *Withering*, in *Fl. Glos.*

Solanum rostratum Dun. Garden weed, Welshmill Hill, Frome, **S.**, *Mrs. N. Wycherley.*

Verbascum virgatum Stokes. Waste ground, Winterbourne, **G.**, *D.M.S.*

Polygonum cuspidatum Sieb. et Zucc. var. *compactum* (Hook. fil.) Bailey. A plant collected from a colony established for some years at Arno's Vale, **S.**, *I.W.E.*, is the above variety, a dwarf form with small, wavy-edged leaves and erect inflorescences, det. *A.J.W.* This variety was figured and described as a species by Sir Joseph Hooker, see *Bot. Mag.* t. 6476 (1880).

P. polystachyum Wall. ex Meisn. Waste ground, Downend, **G.**, *D.M.S.* By Clifton Bridge Station, and near Long Ashton Research Station, **S.**, *I.W.E.* All det. *A.J.W.*

Euphorbia uralensis Fisch. ex Link. Railway embankment, Hambrook, **G.**, *D.M.S.*

Bromus diandrus Roth (*B. Gussonii* Parl.). In quantity over a very small area of loose sand on the Berrow dunes, **S**. This is certainly an introduction, which may spread to further open habitats. The locality is by a main path used by golfers, and the long-awned florets of this species might well have been brought there on woollen clothing.

I am much indebted to Dr. Willis for his help in assembling many of the above records and identifying their voucher specimens.

BRISTOL BIRD REPORT
1961

COMPILED BY THE EDITORIAL COMMITTEE OF THE
B.N.S. ORNITHOLOGICAL SECTION

P. J. CHADWICK R. H. POULDING
H. H. DAVIS M. A. WRIGHT

OBSERVATIONS in 1961 produced some highly important records. From Chew Valley reservoir an Iceland Gull was reported in late March ; a Red-necked Grebe in April ; Little Ringed Plovers in July and September ; and a Spotted Crake and a Little Crake in October – November. Other reports of special interest are of a Serin at the New Grounds in July and a Buff-breasted Sandpiper in September ; a Melodious Warbler on Steep Holm in September and in the same month an Ortolan Bunting on Brean Down. Among Estuary records from the New Grounds are those of Sandwich Terns in April, Curlew Sandpipers in May, a Little Ringed Plover in July and a Little Gull in October. Collared Doves, first noted at Chipping Sodbury in May, 1960, and seen there again in March, 1961, appeared at Shirehampton in August, breeding being proved in September. The event of the year, however, was the occurrence of a Gyr Falcon at Chew Valley where it remained, and was seen by many observers, from early November to the end of December. Noteworthy duck reports from the reservoirs include those of more than eighty Gadwall at Blagdon and Chew Valley in November ; a Red-breasted Merganser at Blagdon in November ; and Red-crested Pochards at Cheddar and Blagdon in the period October – December. From the reservoirs there are also exceptional over-all counts of about 3,600 Pochard in mid – November and more than 1,500 Tufted Duck during the cold spell in late December. The effects of this unusually severe weather on local bird populations will be more fully described in the 1962 *Report.*

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Headings **G.** and **S.** refer to South Gloucestershire and North Somerset, and cover the areas as outlined in previous Reports (cf. *Proc. B.N.S.*, 1960, p.114).

GREAT NORTHERN DIVER *Gavia immer*

S. Reported only from Cheddar res.—six, Jan. 3 (P.H.); up to three in February (several observers) and single birds, Mar. 12 (J.A.McG.) and in December (R.S.H., B.K.).

RED-THROATED DIVER *Gavia stellata*

G. and **S.** One found in field, Chipping Sodbury, Mar. 15, was released at Pill next day (J.F.B.).

GREAT CRESTED GREBE *Podiceps cristatus*

S. Normal winter population at reservoirs. Breeding season records: six pairs, Chew Valley, Apr. 23, but only two broods subsequently found (B.K.); 36 ads., including seven pairs with young, Blagdon, July 9 (P.J.C.).

RED-NECKED GREBE *Podiceps griseigena*

S. Close views obtained of one in breeding plumage, Chew Valley res., Apr. 5 (G.E.C., M.A.W.). Full details supplied.

SLAVONIAN GREBE *Podiceps auritus*

S. Single birds, Cheddar res., Feb. 12 (J.A.McG.) and Barrow Gurney resrs., Sept. 3–17 (P.J.C., P.H., K.B.Y.).

BLACK-NECKED GREBE *Podiceps nigricollis*

S. One, Chew Valley res., Feb. 22 (B.C.) and Nov. 5, 12 (P.J.C., G.S., M.A.W.).

LITTLE GREBE *Podiceps ruficollis*

S. Late summer reservoir totals, adults and juveniles—60, Blagdon, Sept. 3 (P.J.C.) and 97, Chew Valley, Sept. 23 (B.K.).

GANNET *Sula bassana*

S. Ad. found alive, Victoria Park, Bath, July 18, and later taken to Bristol Zoo (*Bath and Wilts Chronicle*).

CORMORANT *Phalacrocorax carbo*

S. Exceptional number of twenty-three, Cheddar res., Dec. 26 (J.A.McG.).

HERON *Ardea cinerea*

S. Notable increase over previous year in total of occupied nests (1960 figures in brackets): twenty-seven (22 or 23), Uphill Grange, May 3 (C.E.R.); thirty-six (4), Brockley Combe, May 5 (J.F.B.) and three (3), Park Wood, Newton St. Loe, May 18 (J.W.W.).

MALLARD *Anas platyrhynchos*

G. Records from the Estuary, New Grounds—1,500, Jan. 20; 1,400, Sept. 17; 600, Nov. 12 (see under **S.** below) and 1,200, Dec. 17 (H.J.B., M.A.O.).

S. Total res. population, Jan.–Feb., between 800 – 900 with salient count of 685, Chew Valley, Jan. 1 (B.K.). Numbers here, excluding ducklings, increased from 122, April 23 to 926, July 29. Autumn reservoir population reached peak of *c.*1885, Nov. 12, decreasing to *c.*1,250, Dec. 17 and to 885, Dec. 26/27, at onset of severe weather.

Breeding records: max. reservoir broods counted—Blagdon, 3; Chew Magna, 1; Chew Valley, 48; also nests or ducklings reported from Cheddar, Kewstoke and The Denny (Mon.).

TEAL *Anas crecca*

G. Very large numbers on Estuary, New Gounds, late autumn —1,700, Dec. 17 (H.J.B., M.A.O.).

S. Max. winter count of 1,157, Chew Valley res., Jan. 1 (B.K.) but total reservoir population fell to less than 700 by 15th and *c.*500, early Feb. Pair, Chew Valley, May 7, and six ads., June 17, but no evidence of breeding. High early autumn count of 709, Chew Valley, Sept. 23 (B.K.): total on all reservoirs, *c.*2,000, Nov. 12 and Dec. 17, but only 400, Dec. 26/27 during cold spell.

GARGANEY *Anas querquedula*

G. One, W.T. enclosures, New Grounds, Mar. 8, and one caught in decoy, same place, Mar. 15 (K.M.D., M.A.O.).

S. Chew Valley res.: pair, Mar. 8 (B.C.) and on 18th (R.M.C.);

three (1♂,2♀♀) end Mar. and April (several observers), and two, July 28, 30 (P.J.C., M.A.W.). Pair, Cheddar res., Apr. 30 (J.A.McG.).

GADWALL *Anas strepera*

G. Max. counts, New Grounds, including W.T. enclosures—14, Jan. 20, and 30, Dec. 16 (M.A.O.).

S. Another successful breeding season, Chew Valley res., where at least eleven broods seen. Total autumn population here and at Blagdon exceeded eighty—salient counts being 26, Chew Valley, Nov. 25 (P.J.C., M.A.W.); *c*.85, Blagdon, Nov. 24 (R.S.H.) and 60 (40 ♂♂), same place, on 29th (G.C.B., S.I.B.).

WIGEON *Anas penelope*

G. Exceptional late autumn concentration on Estuary, New Grounds, Dec. 17, when *c*.3,000 counted (H.J.B., M.A.O.).

S. Total res. population, Jan.–Mar.: *c*.1,250, Jan. 15 and *c*.1,100, Feb. 12, decreasing to less than 250 by Mar. 19. Pair, Chew Valley, May 24 (B.K.). Late autumn peak of *c*.1,290, Dec. 17 (see above under **G.**). Reported from coastal waters only in small numbers with max. count of 50, Weston Bay, Dec. 23 (R.A.).

A first-winter male, found dead by W.L.R., Sand Bay, Jan. 1, died from a fungus infection, *Aspergillus fumigatus*—the first reported case in this species.

PINTAIL *Anas acuta*

G. On Estuary and in W.T. enclosures—60, Jan 20, Oct. 18, and 200, Dec. 16 (H.J.B., M.A.O.).

S. Few reported in winter months with max. of thirteen, Chew Valley res., Jan. 29 (P.J.C., M.A.W.). Four males in eclipse, same res., June 29 (B.K.). In contrast, high autumn reservoir population —123, Nov. 12 (Blagdon, 88; Cheddar, 3; Chew Valley, 32) and 39, Dec. 17 (including 20 at Cheddar). Coastal records: four, Sand Point, Jan. 22, and single male, Weston Bay, May 4 (T.B.S.); four, Axe Estuary, Dec. 17 (B.S.).

SHOVELER *Spatula clypeata*

G. Max. counts, New Grounds—50, Jan. 20, and 70, Dec. 16 (H.J.B., M.A.O.).

S. Reported in large numbers, Chew Valley res., Jan.–Mar.: notable counts include 1,138, Jan. 1 and 1,125 on 8th (P.J.C., M.A.W.); 622, Jan. 15 and 322, Feb. 12 (G.C.B., S.I.B.); 738, Mar. 19 (B.K.). Up to 32, same res., during May but only two broods located. Highest autumn counts—204, Chew Valley, Dec. 17 (G.C.B., S.I.B.) and *c.*90, Cheddar, same date (J.A.McG., M.G.W.).

Red-crested Pochard *Netta rufina*

S. Two pairs, Cheddar res., end Oct. and early Nov., and three (1♂,2♀♀), Dec. 10, 17 (B.K., M.A.W. *et al.*). Pair and single male, Blagdon res., Nov. 19, Dec. 19 (P.H., B.K.).

Scaup *Aythya marila*

S. Single ad. male at reservoirs throughout year. Female, Chew Valley, Mar. 19 (J.A.McG.), Nov. 29 (G.C.B., S.I.B.).

Tufted Duck *Aythya fuligula*

G. Evening flights into W.T. enclosures, New Grounds from Frampton gravel pits continued to early Mar. and resumed in November : max. counts, 182, Jan. 1 and 150, Dec. 19 (several observers).

S. Total reservoir population, Jan.–Mar., not more than 700. Spring maxima of 564, Chew Valley, Apr. 30 and noteworthy summer count of 375 ads., June 10, same res., where at least 65 broods located, end June – Aug. (B.K.). Breeding also reported from Blagdon—single brood of nine, early July (P.J.C., W.L.R.). During cold spell, *c.*1,555 concentrated on ice-free pools at reservoirs, Dec. 26/27. Approx. 50 on R. Avon, Saltford, Dec. 30 (P.H.).

Pochard *Aythya ferina*

S. Female with six half-grown ducklings, Chew Valley res., June 15 (T.B.S.). Rapid autumn increase in total reservoir population from mid-Oct. when *c.*1,500 counted; peak numbers reached Nov. 12, with a record count of *c.*3,600 and 3,300 still present in area on Nov. 26. Highest individual counts—*c.*1,300, Blagdon, Nov. 26 (P.H., B.K.); *c.*2,000, Cheddar, Nov. 25 (T.B.S.), Dec. 2 (R.A.) and 2,307, counted, same res., in ideal conditions by P.J.C. on Dec. 10. Fifty-four, R. Avon, Saltford, Dec. 31 (B.K.).

Goldeneye *Bucephala clangula*

S. Exceptionally high reservoir population, Jan.–Apr.

	Blagdon	Cheddar	Chew Valley	Total	No. of ad. ♂♂
Jan. 15 ..	3	4	13	20	4
Feb. 12 ..	10	1	34	45	14
Mar. 4/5 ..	2 (4th)	2 (4th)	63 (5th)	67	15
Apr. 6 ..	no count	no count	52	52	14

During severe weather, 59 (11 ad. ♂♂), Chew Valley, Dec. 27 (P.J.C.) and 15 (6 ad. ♂♂), Cheddar, on 28th (T.B.S.).

COMMON SCOTER *Melanitta nigra*

S. Pair, Weston Bay, Mar. 11 (T.B.S.).

RED-BREASTED MERGANSER *Mergus serrator*

S. Female or imm., Blagdon res., Nov. 25 (T.B.S.).

GOOSANDER *Mergus merganser*

S. Reservoirs: ad. male, Blagdon, early Jan. to third week, Feb. (several observers); single 'red-head', Cheddar, Dec. 3 (J. A. McG.) and a male on 28th (T.B.S.); up to three (including 1♂), Chew Valley, several dates, December (S.E.C., W.A.H. *et al.*).

SMEW *Mergus albellus*

S. Max. res. total of ten, Feb. 12—two, 'red-heads', Blagdon (B.K.B.) and eight (1 ad.♂), Chew Valley (G.C.B., S.I.B.). Single female, Chew Valley, on unusual dates of May 14, 16 (P.J.C., R.M.C., M.A.W.). Two, females or imms., Blagdon, Dec. 27 (B.K.).

NORTH AMERICAN RUDDY DUCK *Oxyura jamaicensis*

S. Noted most months, Blagdon and Chew Valley resrs.—six (4♂♂,2♀♀), Chew Valley, Mar. 3 (B.K.) and eight (2pairs, 2♂♂, 2 imms.), same place, July 30 (P.J.C., M.A.W.); five, all males, Blagdon, Oct. 30 (M.A.W.). Two males, Cheddar, Dec. 28 (T.B.S.).

Although originally of Wildfowl Trust stock, now established as breeding, Chew Valley, where pair seen with six or seven ducklings, May 18 (H.F.B.F., G.H.) and June 3 (B.K.).

SHELDUCK *Tadorna tadorna*

S. Up to four pairs, Chew Valley res., Apr.–June, but only one brood (nine) located. A breeding season survey on coast, Avonmouth to Weston-super-Mare, gave max. counts of *c.*340 full grown birds, and 240 ducklings (from *c.*34 broods)—the highest figure for this stretch since the survey began in 1958.

WHITE-FRONTED GOOSE *Anser albifrons albifrons*

G. New Grounds: marked increase from *c.*800 at close of previous year to 1,500, Jan. 18, and 3,000 on 26th; rather fewer in early Feb. but further increase to peak total of 3,500 on 22nd and 25th;

2,850 still present, Mar. 2, numbers falling rapidly to 1,100 on 7th and 360 on 10th; final count of 83, Mar. 15, of which only four seen next day (W.T.). First autumn arrivals—four, Sept. 29, but over 80, Oct. 7, with steady increase to 133, Oct. 18; 350, Nov. 23; 800 Dec. 22, and 1,800 on 31st (W.T.). About 55 overhead between Avonmouth and Shirehampton, Dec. 31 (C.L.).

S. Chew Valley res.: 16, Jan. 22 (P.H., B.K.); up to 13, various dates, Feb. (B.C., P.J.C., W.J.S., M.A.W.) and ten, Mar. 3 (B.K.); 15 in flight, Dec. 23 (J.R.B.). About 65 grey geese, probably White-fronts, flying E., Sand Bay, Dec. 24 (T.B.S.).

LESSER WHITE-FRONTED GOOSE *Anser erythropus*

G. Seen at New Grounds once only—a single ad., Feb. 17; bird again identified on 21st (K.M.D., M.A.O., P.J.O.).

BEAN GOOSE *Anser fabalis*

G. One, probably not same bird as reported in previous Dec., New Grounds, Jan. 26 (K.M.D.).

PINK-FOOTED GOOSE *Anser brachyrynchus*

G. Single bird, New Grounds, Jan. 25, Feb. 2, and party of seven, Feb. 14 (W.T.). First autumn birds, same place, eight, Oct. 13, with immediate increase to 33 on 20th; later counts of 35, Nov. 25 and 39, Dec. 10—but none seen after Dec. 23 (W.T.).

S. One seen during foggy weather, at a range of 30 yds., in field nr. Kingston Seymour, Oct. 15, by J.R.B. and C.L. (necessary details recorded).

BRENT GOOSE *Branta bernicla*

G. One, New Grounds, in autumn, 1960, stayed to following Mar. 7; another present, Feb. 14–Mar. 6; two, same place, Apr. 15–18 and single bird seen, various dates, Nov. 25–Dec. 22 (all dark-breasted form *B. b. bernicla*) (W.T.).

S. One, dark-breasted, on shore, Sand Bay, Feb. 5 (R.A., M.A.S., T.B.S.).

BARNACLE GOOSE *Branta leucopsis*

G. Single bird with White-fronts, New Grounds, Nov. 25 to end of year (W.T.).

MUTE SWAN *Cygnus olor*

G. Survey of waters within City boundary in June showed only one brood—pair and four cygnets, Alcove Lido, Fishponds. Ten adults and two immatures at four other sites but no evidence of breeding.

S. Total of 155 at reservoirs, Nov. 12 (36, Blagdon; 16, Chew Valley and 103, Cheddar). Autumn counts, R. Avon, Pultney Weir to Midland Bridge, Bath—92, Sept. 29, and 98, Dec. 26 (B.K.).

WHOOPER SWAN *Cygnus cygnus*

G. One seen frequently in enclosures, New Grounds, Jan. 24–Mar. 13 (K.M.D., M.A.O. *et al.*).

S. Cheddar res.: three immatures, Nov. 4 to early Dec.; two Dec. 10, and one on 26th (many observers).

BEWICK'S SWAN *Cygnus bewickii*

G. New Grounds: up to eleven, some often in W.T. enclosures, Jan. to early April and also in late autumn, with max. of thirteen Nov. 11 to end of Dec. An ad., the first of this species to be ringed in Britain, was caught in enclosures, Apr. 2, and subsequently recaptured, same place, Nov. 21, where frequently seen to end of year.

S. Three ads. in flight, Sand Point, Jan. 1 (R.A.). Unusual number of reservoir records : three ads., Chew Valley, Jan. 1 (P.H.), increasing to 23 (seven 1st W.) by end of month (J.A.McG., M.G.W.), but only eight (four 1st W.) remaining, Feb. 2 (G.L.B.). Returned to area, Nov. 4 when 15 ads. seen, Chew Valley res. (R.S.H.) and subsequently up to 46 (max. of seven 1st W.) distributed between this res. and Blagdon until late Dec. (many observers). One, Cheddar, Dec. 28 (T.B.S.).

BUZZARD *Buteo buteo*

G. Single birds, New Grounds, Feb. 4 (M.W.H., M.A.O.) and nr. Rockhampton, May 14 (J.D.R.V.).

S. Frequently reported from Mendip area; also at Blagdon and Chew Valley resrs., Long Ashton, Goblin Combe, Congresbury, Hutton and Brean Down.

SPARROWHAWK *Accipiter nisus*

G. and **S.** Despite reports from other parts of the country, records suggest numbers are well maintained.

HOBBY *Falco subbuteo*

G. Single birds, New Grounds, Sept. 17, 24, Oct. 11 (L.P.A., M.A.O.).

S. One, Chew Valley res., June 4 (R.M.C.).

PEREGRINE *Falco peregrinus*

G. New Grounds: one, imm., Feb. 5 (B.K.); one, Mar. 2, 6; ad. male, Oct. 8–Nov. 15 (L.P.A., H.J.B., M.A.O.).

S. Single birds, Brean Down area, Feb. 3, 28, Mar. 4 (R.A.); Barrow Gurney resrs., Oct. 6 (M.A.W.). Two, ad. and imm., Chew Valley res., several dates, Nov. 9 to close of year (various observers).

GYR FALCON *Falco rusticolus*

S. A falcon, too large for Peregrine, seen in flight and perched at Chew Valley res. by P.J.C. and M.A.W. on Nov. 5 was considered to be a Gyr Falcon; bird, subsequently identified on frequent occasions by G.S., remained until close of year and was seen by W.A.H., J.A.McG., H.W.N., the original observers and others. Field notes include: large size; broad, rather bluntly pointed wings; long tail; lack of distinct facial pattern and moustachial stripe; slow, powerful wing-beats and when at rest, wing-tips falling considerably short of tail. Identification confirmed by *Brit. Birds* Rare Birds Committee. First record for Bristol Area and Somerset. (A large falcon seen by R.S.H. at Downside Abbey, Nov. 6, was possibly the Chew Valley bird.)

MERLIN *Falco columbarius*

G. One, New Grounds, Feb. 18, Mar. 23 (L.P.A., M.A.O.).

S. Single birds, Chew Valley res., Jan. 15 (R.E.H., K.B.Y.), Nov. 17 (B.K.); two, male and female or imm., same place, Dec. 22 (J.R.B.).

KESTREL *Falco tinnunculus*

G. One, apparently going to roost, St. Mary Redcliffe Church, Bristol; seen to enter aperture near top of spire in late afternoon, Jan. 5 (H.H.D.).

S. Steep Holm: not noted during visits, Apr.–July, but ten seen crossing Estuary from direction of Welsh coast between Sept. 23 and Oct. 7 (Res. Stn.).

RED-LEGGED PARTRIDGE *Alectoris rufa*

S. Two calling nr. Crook Peak, Mendip, Mar. 25 (R.A.). Pair, Saltford, May 11 (B.K., W.J.S.) and Brean Down, Sept. 23 (E.G.H.). Two close to Brean Farm, Dec. 17 (B.S.).

PARTRIDGE *Perdix perdix*

S. At Tickenham, in July, a newly hatched brood of nine suffered the unusual fate of being trapped in a roadside pool of liquid tar; both adults, giving distraction display, were seen close by (H.R.H.).

QUAIL *Coturnix coturnix*

G. Again reported from Marshfield where one heard, June 15 (P.H., B.K.) and this, or another, on 21st (R.M.C.).

S. One calling in mowing grass adjoining Leigh Woods, May 23, but not heard on subsequent visits (P.J.C.).

WATER RAIL *Rallus aquaticus*

G. One in W.T. enclosures, Jan. 16–24, and single birds caught and ringed on four occasions, Sept. 1–Oct. 25; unringed bird seen, same enclosures, Nov. 27, Dec. 22 (M.D., M.A.O.).

S. Sand Bay: 22 driven out of *Spartina* beds by rising tide, Jan. 19, Feb. 17 (T.B.S.) and at least ten seen leaving the beds Feb. 18 (W.L.R.); reported also, usually single birds but sometimes half a dozen or more, various occasions, Feb.–Mar. and Sept.–Dec. (R.A., T.B.S.). One seen in a pet shop at Wells, Sept. 23, and later released, had been found in a nearby drain (J.A.McG.). One, Blagdon res., Oct. 21 (J.R.B., C.L.). Chew Valley res.: heard or seen, usually single birds but sometimes two, Jan. 14 (J.B.R., C.L.); Feb. 12 (W.J.S.); May 26 (B.C.), 30 (R.A.); July 26 (B.K.); Nov. 5, 23, 25 (R.A., J.A.McG., G.S. *et al.*); Dec. 9 (R.M.C.), 28 (J.R.B., C.L.). Calling heard, probably from clay-pits, Cheddar res., Dec. 10 (P.J.C., M.A.W.).

SPOTTED CRAKE *Porzana porzana*

S. One flushed at close range from *Equisetum* bed, Chew Valley res., Oct. 28, and seen under excellent conditions, by R.S.H. who refers to its small size; short bill; medium brown upper-parts with conspicuous patterning and clear, unstriped buffish yellow under-tail coverts. Same observer states that the bird was probably present on Oct. 13, and J.A.McG. records that on Nov. 5 he had a very brief view and heard the characteristic and sustained 'kick' or 'wit' calls close to the same spot.

LITTLE CRAKE *Porzana parva*

S. A small crake seen twice by M.A.W. at Chew Valley reservoir, Nov. 5, was identified as this species. Field notes: very small size (no larger than Starling); head, neck and under-parts blue-black; under tail dark with some white at sides; short bill, with red spot; and dark legs. Record confirmed by *Brit. Birds* Rare Birds Committee.

CORNCRAKE *Crex crex*

S. Slightly injured bird on roadside, Clapton-in-Gordano, Oct. 5 (H.H.D.).

COOT *Fulica atra*

G. Two, Eastville Park Lake, Bristol, Dec. 30, 31 (R.H.P.).

S. Chew Valley res.: 1,000–1,200, Aug.–Sept., but numbers generally fewer than in previous year (B.K.). Cheddar res.: counts varied from 1,500 in mid-Jan. to 800 in mid-Feb. (J.A.McG., G.S.), and in the final quarter 200 were present, Oct. 7 (R.M.C.), numbers increasing rapidly thereafter to 1,500, Nov. 12; 1,800, Dec. 2; 2,200, Dec. 10 and 26th (various observers), and to an estimated peak total of 4,000 on 28th (T.B.S.). About 50, R. Avon, nr. Saltford, in hard weather, Dec. 30 (P.H.).

OYSTERCATCHER *Haematopus ostralegus*

G. Single birds, Sharpness, May 28 (J.D.R.V.) and Oldbury, Aug. 12 (R.M.C.).

S. Inland records of single birds: Chew Valley res., Jan. 4, July 15 (J.R.B., C.L.), Nov. 5 (P.J.C., M.A.W.) and Barrow Gurney resrs., Mar. 9 (M.A.S.). Ninety-two, Sand Bay, May 22 (T.B.S.). Up to five, Steep Holm, Sept. 24–28 (Res. Stn.). 175, Weston Bay, Oct. 9 (R.A.).

LAPWING *Vanellus vanellus*

G. Max. count, New Grounds, 1,000, Jan. 22 (M.A.O.).

S. About 2,000, Axe Estuary, Jan. 1 (R.A.). Pairs located in breeding season: Chew Valley res.; nr. Chew Magna; Portbury area (G.B., W.J.S.); Walton, Tickenham and Kenn moors (P.J.C.). Strong southerly movement noted during hard weather in late Dec.; more than 2,900 counted over Chew Valley res., 1230–1500 hrs., on 27th (P.J.C., M.A.W.).

RINGED PLOVER *Charadrius hiaticula*

G. Fifty, New Passage, Jan. 22 (P.J.C.); *c.* 200, Oldbury, Aug. 12 (R.M.C.) and Chittening Warth on 13th (K.B.Y.); *c.*300, Sheperdine, Sept. 15 (J.D.R.V.).

S. Frequent on autumn passage, Chew Valley res.; noteworthy counts of 30+, Aug. 17 (J.A.McG.) and 56 on 27th (R.M.C.). Max. count, Weston Bay—Sand Bay area, 160, Sept. 9 (T.B.S.).

LITTLE RINGED PLOVER *Charadrius dubius*

G. Single bird, New Grounds, July 21 (L.P.A.).

S. Immature birds, Chew Valley res.: one, July 22 (R.S.H.), 23 (J.A.McG.); two, Sept. 9 (W.L.R., T.B.S. *et al.*); three, Sept. 24 (G.S.).

GREY PLOVER *Charadrius squatarola*

G. Sixteen, New Grounds, Aug. 25, and nine, Sept. 23 (L.P.A.). Two, Severn House Farm, nr. Berkeley, Nov. 11 (J.D.R.V.).

S. Yeo Estuary: six, Jan. 8 (J.R.B., C.L.); 15, Feb. 12; five, Apr. 23 (T.B.S.) and up to six, Sept. 23–Dec. 17 (R.A., T.B.S. *et al.*). Single birds, Chew Valley res., Oct. 7 (R.M.C.) and Cheddar res. on 21st (R.A.).

GOLDEN PLOVER *Charadrius apricarius*

G. Two of northern form, *C. a. altifrons*, Slimbridge, Mar. 17 (L.P.A.). Sixteen, Penpole Point, Nov. 11 (M.J.Y.) and nine, nr. Wick, Dec. 30 (D.R.H.).

S. About 750, Axe Estuary, Jan. 17 (R.A.). Counts from Marksbury include: 405, Jan. 15 and *c.*450 (several of northern form), Mar. 26 (P.J.C., M.A.W.). 25, Priddy, Nov. 11 (J.A.McG.). Chew Valley res.: seven, July 29; *c.*50, Oct. 28; 20, Dec. 23 (J.R.B., C.L.). Up to 15, Blagdon res., Sept. 29–Oct. 14 (G.C.B., S.I.B. *et al.*).

TURNSTONE *Arenaria interpres*

G. Twenty, New Passage, Jan. 22 (P.J.C.), Nov. 5 (R.M.C.); 52, Chittening Warth, Aug. 13; 151, same place, Sept. 25 (K.B.Y.).

S. One, sometimes two, Sand Bay, May 30, Aug. 8–Oct. 15 (R.A., T.B.S.). Single birds, Chew Valley res., June 24 (J.R.B.), Aug. 8 (R.A.).

COMMON SNIPE *Capella gallinago*

S. At least 150, Chew Valley res., Jan. 22 (B.K.). 70 counted over *Spartina* beds, Sand Bay, Feb. 12 (R.A.).

JACK SNIPE *Limnocryptes minimus*

S. Up to four, Sand Bay, Jan. 1–Mar. 19 (R.A., T.B.S.). Single birds, Chew Valley res., Feb. 12 (W.J.S.), Oct. 28–Dec. 12 (various observers). One, Pen Hill, nr. Wells, Dec. 16 (R.S.H.).

WOODCOCK *Scolopax rusticola*

G. Single birds, Chittening Warth, Nov. 11; Penpole Woods, Dec. 23 (K.B.Y.).

S. One, Brean Down, Jan. 21 (H.G.H.).

CURLEW *Numenius arquata*

S. Pair, Walton Moor, May 12 (P.J.C., M.A.W.). About 500 nr. Pill, Aug. 30 (J.F.B.).

BLACK-TAILED GODWIT *Limosa limosa*

G. New Grounds: one, May 24; two, June 30–July 6; up to 12, July 23–Aug. 14; twenty, Sept. 21 and two on 25th (L.P.A.).

S. Chew Valley res.: one in breeding plumage, Apr. 6 (J.A.McG.); four, July 28 (P.J.C.); two, Aug. 11 (K.B.Y.); single birds, Aug. 13–19 (various observers) and Dec. 23 (J.R.B.). Sand Bay–Weston Bay area: eleven, July 8; *c*.80, Oct. 21 (T.B.S.), Nov. 12 (R.A.); 152, Nov. 26 and fifteen, Dec. 23 (R.A.).

BAR-TAILED GODWIT *Limosa lapponica*

S. Weston Bay–Sand Bay area reports include: 25, Feb. 13 (R.A.); single birds, Apr. 23, May 30 (T.B.S.); ten, Oct. 8; up to four, Nov. 12–Dec. 25 (R.A.).

GREEN SANDPIPER *Tringa ochropus*

G. Two, Littleton, Apr. 8 (J.D.R.V.), Aug. 19 (P.J.C.) and one, Nov. 25 (J.D.R.V.). Reported singly, Oldbury, Aug. 12 (R.M.C.); Sheperdine on 19th (J.D.R.V.); New Grounds, Aug.–Sept. and Nov. 14 (L.P.A.).

S. Single birds, Yeo Estuary, Apr. 2, 4; two, Aug. 11, 13 and one, Sept. 23–Nov. 12 (J.R.B., C.L., T.B.S.). Eight, Litton res., July 7 (B.K., K.B.Y.). Chew Valley res.: 19, July 30 (J.A.McG.); 13, Aug. 8 (R.A.); up to eight, Sept. 3–Nov. 11 and one, sometimes two, Dec. 2–16 (various observers). Single birds, Blagdon res., Aug. 8 (T.B.S.), Sept. 17 (P.J.C.) and Barrow Gurney resrs., Sept. 8, Dec. 17 (K.B.Y.). Two, nr. Yatton, various dates, Aug.–Sept. and one, same place, Dec. 12 (H.H.D.). Two nr. Wells, Nov. 30, and single bird, Dec. 7 (J.A.McG.).

WOOD SANDPIPER *Tringa glareola*

S. Chew Valley res.: three, Aug. 8 (R.A.); four on 13th (B.K., W.J.S.); one, sometimes two, Aug. 16–29 (various observers) and single bird, Sept. 30 (R.A.).

COMMON SANDPIPER *Tringa hypoleucos*

S. Birds, presumed wintering: up to three, Chew Valley res., Jan. 1–29 and Nov. 19–Dec. 23 (various observers).

REDSHANK *Tringa totanus*

S. Bird trapped, Pill, Mar. 6, was found to have wing length of 172 mm.—a measurement falling within range quoted for Iceland race *T. t. robusta* (M.J.B., R.H.P.). Pairs in breeding season: five, Chew Valley res.; one, nr. Chew Magna (G.B., W.J.S.); one, Kenn Moor (P.J.C.); four, Portbury (G.B., W.J.S.); one, Wick St. Lawrence (T.B.S.); three, Yeo Estuary (W.L.R.). Max. coastal count—*c.*400, Weston Bay, Oct. 8 (R.A.).

SPOTTED REDSHANK *Tringa erythropus*

G. New Grounds: up to four, July 23–Sept. 7; seven, Sept. 8, Oct. 22 and three on 29th (L.P.A., M.A.O.).

S. Reservoir records of single birds: Blagdon, Sept. 3 (P.J.C., M.A.W.); Chew Valley, Sept. 21–23 (B.K., G.S., J.W.W.); Litton, Sept. 24 (R.C.L.); Cheddar, Dec. 2 (G.S.). One, Saltford sewage farm, Sept. 10 (P.J.C., M.A.W.).

GREENSHANK *Tringa nebularia*

G. New Grounds: one, sometimes two, July 15–Aug. 30; nine, Sept. 19; one, Oct. 29 (L.P.A., H.J.B.). Single bird nr. Sheperdine, Aug. 19 (J.D.R.V.).

S. Reservoirs: up to six, Chew Valley, July 26–Sept. 10, thereafter single birds until Oct. 28 (various observers); two, Barrow Gurney, July 27 (K.B.Y.), Oct. 12, and single birds, on 25th and 28th (T.B.S.); four, Blagdon, Aug. 8 (T.B.S.) and two, Sept. 9–30, then single birds until Nov. 11 (various observers); one, Cheddar, Oct. 29 (P.J.C., M.A.W.). Up to three, Yeo Estuary, Aug. 19–Oct. 15 (J.R.B., C.L., T.B.S.).

KNOT *Calidris canutus*

G. Ninety-two, Chittening Warth, Sept. 25 (K.B.Y.).

S. Counts for Weston Bay–Sand Bay area include: *c.*2,000, Jan. 20; *c.*600, Dec.10; *c.* 3,000 on 24th (R.A.).

LITTLE STINT *Calidris minuta*

G. New Grounds: up to three, May 5–15; up to seven, Aug. 25–Sept. 28; single bird, Oct. 22; two, Dec. 1 and one on 3rd (L.P.A.).

S. Single birds, Chew Valley res., various dates, July 19–Sept. 25 (R.A., P.J.C., R.S.H., M.A.W.). One, R. Axe, Uphill, Oct. 8 (R.A.).

CURLEW SANDPIPER *Calidris testacea*

G. One, sometimes two, New Grounds, May 12–28; single bird, same place, July 24 (L.P.A.).

S. Single birds, Chew Valley res., Sept. 25 (R.S.H.), 30 (R.A.).

BUFF-BREASTED SANDPIPER *Tryngites subruficollis*

G. Single bird, New Grounds, Sept. 17 (L.P.A.)—full details supplied include: buff throat, breast and underparts (clear and unmarked); pale buff edges to feathers of back and wings giving a scaly effect; absence of white on rump; straw-coloured legs and extreme tameness. Record (first for Bristol Area and Gloucestershire) accepted by *Brit. Birds* Rare Birds Committee.

RUFF *Philomachus pugnax*

G. Up to five, New Grounds, July 23–Sept. 28, and two, Nov. 23; one in W.T. enclosures, Dec. 28–31 (L.P.A., M.A.O., P.J.O.).

S. One, Kingston Seymour, Mar. 5 (W.A.H.). Chew Valley res.: up to seven, Mar. 9–30; three, July 28; up to six, Aug. 16–Sept. 9; single birds, Oct. 7–Nov. 12, and five, Dec. 2, 3 (various observers).

ARCTIC SKUA *Stercorarius parasiticus*

G. Two, ad. and imm., on the Estuary, New Grounds, Oct. 23, and single imm., Oct. 27, 31, Nov. 2 (L.P.A.).

GREAT BLACK-BACKED GULL *Larus marinus*

G. New Grounds: 32 ads., Jan. 21, and 82, majority ads., Dec. 10 (B.K.).

S. Reported in several months at reservoirs with max. of 11 (8 ads.), Cheddar, Dec. 10 (P.J.C., M.A.W.) and five, Chew Valley, Dec. 27 (B.K.). Breeding colony on The Denny (Mon.) steadily increasing—*c.*25 nests located, May 19 and *c.*100 ads. round the island (H.H.D., J.H.S.)—cf. *Proc. B.N.S.*, 1956, p.201. Recoveries of gulls ringed on Steep Holm include:—

931275 (pullus) 3/7/57 : shot nr. Langport, Som., 25 m. S.S.E., 31/12/60.

Lesser Black-backed Gull *Larus fuscus graellsii*

S. Roosting noted, Chew Valley res., spring (*c.*250 in April) and late summer/autumn (350, Aug., decreasing to 200, mid-Nov.) (P.J.C., B.K.).

Herring Gull *Larus argentatus*

S. Roosting noted, Chew Valley res., Mar. and Nov.–Dec., with max. of 700–800, mid.-Nov. (B.K. *et al.*). Recoveries of birds ringed on Steep Holm include:—

409144 (ad.) 17/3/53: Barnstaple, Devon, 44m. W.S.W., 9/9/61.
403551 (ad.) 13/11/55: shot, Skomer, Pembs., 97m. W.N.W., 11/5/61.
AJ16735 (pull.) 9/7/60: Hardway, Gosport, Hants., 92m. E.S.E., 3/6/61.

Iceland Gull *Larus glaucoides*

S. First or second-year bird, with *fuscus* and *argentatus*, Chew Valley res., Mar. 31, Apr. 1 (P.J.C., M.A.W.).

Little Gull *Larus minutus*

G. First-winter bird on Estuary, New Grounds, Oct. 30 (L.P.A.).

Kittiwake *Rissa tridactyla*

S. A few "wrecked" in early February: dead ad. and imm., Weston Bay, Feb. 6; dead ad., Cheddar res., on 11th; and imm. in flight, Kingston Seymour/Yeo Estuary on same date (R.A., C.L. *et al.*). Injured ad., Cheddar res., Mar. 31, found dead, Apr. 5 (J.A.McG., M.G.W.). Immature in flight, Sand Bay, Sept. 9 (T.B.S.).

Black Tern *Chlidonias niger*

G. Three over Estuary, New Grounds, Aug. 8; one, same place, Sept. 14, 16 and two on 15th (L.P.A., H.J.B.).

S. Only one spring record—48, Chew Valley res., May 13 (I.H.S., M.A.W.). Autumn passage, Aug. 8–Oct. 15, all records from reservoirs and about half refer to solitary birds: max. counts—18, Blagdon, Aug. 8 (M.A.S., T.B.S.); 21, Chew Valley, Sept. 1 (B.K.); 12, Barrow Gurney, Sept. 3 (P.J.C.); and six, Cheddar, on 17th (J.A.McG.).

Common Tern *Sterna hirundo* Arctic Tern *Sterna macrura*

G. One on Estuary, New Grounds, Apr. 27; four, same place, July 14 and one or two, various dates, July 17–Oct. 17 (L.P.A.). One on Estuary, off Oldbury, Aug. 20 (J.D.R.V.).

S. Two spring records: one, Chew Valley res., Apr. 15; Blagdon res., May 14. Also noted in mid-June, apparently on northward passage—six, Chew Valley, on 11th; one on 17th and two, Blagdon on 24th. Return passage, July 22–Oct. 1: numbers also small with max. of 20, Chew Valley, Aug. 29 (various observers).

LITTLE TERN *Sterna albifrons*

G. New Grounds: single birds on Estuary, May 14, Sept. 14 (L.P.A.).

S. Two, Chew Valley res., Aug. 29 (J.R.B., C.L.).

SANDWICH TERN *Sterna sandvicensis*

G. Six over Estuary, New Grounds, Apr. 21 (L.P.A.).

S. Two, Chew Valley res., Aug. 27 (G.L.B.).

RAZORBILL *Alca torda*

S. Single bird off south landing, Steep Holm, May 28 (Res. Stn.).

GUILLEMOT *Uria aalge*

S. Remains of dead bird, Yeo Estuary, Apr. 1 (J.R.B., C.L.).

STOCK DOVE *Columba oenas*

S. Breeding season records from Blagdon, Chew Valley, Kewstoke, Shipham, Axbridge and Wells (J.A.McG., T.B.S.).

WOODPIGEON *Columba palumbus*

S. Two, Steep Holm, Apr. 15 and one, May 31; imm. bird on island, Sept. 24, and ad. bird on 27th and 28th (Res. Stn.).

TURTLE DOVE *Streptopelia turtur*

S. Breeding season records from Chew Valley, Rowberrow Warren, Cheddar Gorge, Kewstoke Woods and elsewhere. Single bird, Steep Holm, Sept. 30, Oct. 4 (Res. Stn.).

COLLARED DOVE *Streptopelia decaocto*

G. Two, probably a pair and evidently attracted by free-flying Barbary Doves (*S. risoria*), made a brief stay in a garden at Chipping Sodbury on May 7, 1960 (R.V.C.). Single bird trapped in Barbary aviary in same garden by R.V.C., Mar. 25, 1961, was handled on

26th by same observer and H.H.D. before release; it remained in the vicinity to Apr. 21 when joined by a second bird, both being last seen on 23rd (R.V.C.). Species next reported in following August from suburban gardens and cemetery at Shirehampton, Bristol, where first identified by H.W.N. and where up to max. of eight seen by various observers in period Aug.–early Oct. C.L., who had the doves under frequent observation, records: pair, Aug. 1, increasing to two pairs by 25th and eight birds (of which two apparently juvenile), Oct. 4, six staying to end of year. One pair bred, the nest, built largely of mesh wire fragments, being found and photographed by C.L. near top of 40ft. Cypress in mid-Sept.—one egg on 19th and two on 20th, from which young hatched a fortnight later but died at two days old during a particularly cold night.

Barn Owl *Tyto alba*

G. and **S.** Reported at all seasons and from widely separated areas.

Long-eared Owl *Asio otus*

S. Close view of one, being persistently mobbed by Jays and small passerines, in yew tree on outskirts of woodland, Wraxall, in late Dec., 1960 (W.G.); in field description observer refers to the ear tufts, deep yellow iris; and the generally slim appearance and paler plumage as compared with Tawny Owl.

Swift *Apus apus*

G. and **S.** Early migrants, Apr. 21–23, but main arrival from 28th onwards. Large numbers present on cold, windy days, Chew Valley res.—over 2,000, May 21 (R.S.H. *et al.*) and *c.*5,000, June 10 (M.J.B.). Last record: Sand Point, Sept. 9 (T.B.S.).

Hoopoe *Upupa epops*

S. One on lawn, Chew Magna, May 25, 26: seen also, probably same bird, Chew Stoke, during week ended June 3 (T.H.P.).

Lesser Spotted Woodpecker *Dendrocopos minor*

S. Single birds, South Stoke, nr. Bath, Mar. 19 (K.A.H.); Blagdon, Apr. 3 (T.B.S.) and Newton St. Loe, nr. Bath, on 27th (J.W.W.). Two, Saltford, June 26, July 2 (B.K.).

Woodlark *Lullula arborea*

S. One in song and pair in flight, Crook Peak, Mar. 25 (R.A.).

SKYLARK *Alauda arvensis*

Cold weather movements—end December.

G. and **S.** New Grounds: *c.*260 in three parties moving south, Dec. 30 and *c.*240 on 31st (L.P.A.). Continuous S.W. passage throughout day, Pill, Dec. 31—most flocks of 30–50 birds (J.F.B.). Also noted on similar course, Yatton Moor, same date, and over Clapton-in-Gordano for several days during and just prior to freeze-up in late December (H.H.D.).

SWALLOW *Hirundo rustica*

S. Considerable S.E.—E.S.E. movement, Steep Holm, Sept. 23–Oct. 7 when at least 3,000 noted (Res. Stn.). One, Brean Down, on late date of Nov. 17 (P.G.H., M.A.W.). One (pull.) ringed (AA 51822), Nailsea, 2/6/60; recovered, Pewsham, Chippenham, Wilts., 24/5/61 (M.V.T., S.M.T.).

SAND MARTIN *Riparia riparia*

S. First migrants, Chew Valley res., Mar. 12 (P.J.C., M.A.W.). No longer breeding in stone wall, Pensford (W.J.S.), and only one pair nesting in railway embankment drain pipes, Bedminster, Bristol (J.F.B.).

RAVEN *Corvus corax*

S. The only breeding record is of pair rearing three young, Brean Down (R.A., W.L.R. *et al.*).

BLUE TIT *Parus caeruleus*

S. Small movement, Steep Holm, several days, Sept. 23–Oct. 7: total of 26 caught and ringed—one (AB15669—1st W) recovered nr. Bridgwater, 19m. S., *c.*Oct. 23 (Res. Stn.).

COAL TIT *Parus ater*

S. Single birds ringed, Steep Holm, Sept. 29, Oct. 3 and 5 (Res. Stn.)—cf. *Proc. B.N.S.* 1958, p.453, for previous record.

WILLOW TIT *Parus atricapillus*

S. One seen, and heard giving typical call-notes, Shipham, Dec. 2 (T.B.S.).

LONG-TAILED TIT *Aegithalos caudatus*

G. and **S.** Reports again suggest species to be more numerous than usual—cf. *Proc. B.N.S.*, 1960, p.132.

TREECREEPER *Certhia familiaris*

S. One, a very pale bird, trapped and ringed, Steep Holm, Oct. 1 (Res. Stn.)—second record for island, cf. *Proc. B.N.S.*, 1957, p.371.

DIPPER *Cinclus cinclus*

S. One or two, various dates, Combe Hay–Midford area just S. of Bath, Feb., May and Oct.–Nov. (K.A.H.).

MISTLE THRUSH *Turdus viscivorus*

S. Westerly movements noted Brean Down, Oct. 21 (E.G.H.) and Sand Point on 22nd (R.A.).

REDWING *Turdus musicus*

S. Estimated 21,000 at roost, Rowberrow Warren, Shipham, Jan. 7, and *c.*6,250, Feb. 21 (T.B.S.).

RING OUZEL *Turdus torquatus*

S. Two, Crook Peak, Compton Bishop, Mar. 21 (R.A.) and four on adjoining Wavering Down on 31st (M.A.S., T.B.S.). Four females, Brean Down, Apr. 9 (E.G.H.). One, Steep Holm, Sept. 23 (Res. Stn.) and two, Sand Point, Nov. 4 (M.A.S., T.B.S.).

STONECHAT *Saxicola torquata*

G. and **S.** Breeding reported from Brean Down, Sand Point and Wavering Down, Compton Bishop (various observers). Male, Filton railway embankment—a former breeding site—June 23–July 10 (R.A.). Many other observations from coastal and inland localities, Jan.–Apr. and Sept.–Dec.

BLACK REDSTART *Phoenicurus ochruros*

S. Male, and female or immature, Brean Down, various dates, Feb. 10–Mar. 26 (E.G.H., C.M. *et al.*).

ROBIN *Erithacus rubecula*

S. Pair bred, Steep Holm—nest with 3 eggs (full clutch) in rock crevice: small passage movement, same place, Sept. 23–Oct. 7 (Res. Stn.). One ringed, Long Ashton, 16/10/56, retrapped there, 26/12/61 (G.E.C.) and juv. ringed (AB45153), Saltford, 13/8/61, trapped 16m. E. at Pewsham, Chippenham, Wilts, 11/11/61 (M.A.W.).

GRASSHOPPER WARBLER *Locustella naevia*

G. One, Stoke Gifford, Apr. 25 (R.H.P.).

S. Single birds, Sand Point, Apr. 16 (T.B.S.) and Brean Down May 19 (R.A.). Breeding season records from Leigh Woods (P.J.C.), Walton Moor (P.J.C., M.A.W.) and Blackdown (Mendip) (T.B.S.).

REED WARBLER *Acrocephalus scirpaceus*

S. First migrants—Cheddar and Chew Valley resrs., Apr. 23 (R.M.C., J.A.McG.). At least six pairs during breeding season, Chew Valley (B.K.): also noted in June at Sutton Wick, nr. Temple Cloud (R.S.H.) and Walton Moor, nr. Clevedon (P.J.C., M.A.W.).

MELODIOUS WARBLER *Hippolais polyglotta*

S. First-winter bird trapped and ringed, Steep Holm, Sept. 27 (Res. Stn.). Bird examined and identified by D.M.C., P.J.C. and M.A.W. who report that it was a dull pale specimen lacking the bright yellow underparts usually featured in reference books. Upper parts hair-brown with olivaceous tinge; underparts grey-white tinged with yellow especially down centre of belly; yellow chin and throat, and short yellowish eyestripe and orbital ring; tarsus blue-grey on front surface but pale brown behind. The most striking feature was the broad, long, horn-coloured bill (lower mandible orange-yellow). Record (first for Bristol Area and Somerset) accepted by *Brit. Birds* Rare Birds Committee.

BLACKCAP *Sylvia atricapilla*

S. Winter records: two (♂ and ♀) in garden, Saltford, Jan. 2 (P.H.) and one at bird table, Freshford, nr. Bath, Dec. 21–26 (C.N.V.). One with migrant Chiffchaffs, Clapton-in-Gordano, Mar. 14 (H.H.D.).

WHITETHROAT *Sylvia communis*

G. and **S.** First migrant—one, Sand Point, Mar. 31 (R.A.): main arrival—mid to end Apr. (P.J.C., R.H.P.). Juvenile ringed (AA95389), Moorend, Winterbourne, nr. Bristol, July 29, caught Trancoso (Beira Alta), Portugal, *c.*Sept. 12 (R.H.P.).

LESSER WHITETHROAT *Sylvia curruca*

G. and **S.** First arrivals, Apr. 16. Freshly dead ♀ found on road, Horfield, Bristol, June 5 (R.H.P.). Breeding season records from: **G.**—Sheperdine, Hill, Stone, Oldbury, Littleton, Thornbury and

Sea Mills; and **S.**—Yatton, Cadbury Camp, Dundry, Bath, Chew Valley area, Butcombe, Chilcompton and Wookey Hole, nr. Wells (various observers).

WILLOW WARBLER *Phylloscopus trochilus*

G. Early record of one, New Grounds, Mar. 22 (M.A.O.).
S. First arrivals, Apr. 1–3: main body, Apr. 6 onwards.

CHIFFCHAFF *Phylloscopus collybita*

G. One in garden, Thornbury, Jan. 12 (J.D.R.V.). First bird reported, New Grounds, Mar. 5 (M.A.O.). One singing repeatedly on mild day, Wick, Nov. 6 (D.R.H.).

S. Single birds in song, Chew Valley, Feb. 12 (W.J.S.) and Uphill, nr. Weston-s-Mare on 15th (R.A.)—evidently wintering birds. First migrants, Mar. 11/12—well distributed by end of month.

GOLDCREST *Regulus regulus*

S. Common during breeding season in Leigh Woods—Failand area (P.J.C.). Small passage movement, Steep Holm, Sept. 23–Oct. 7: max. of seven, Sept. 25 (Res.Stn.).

PIED FLYCATCHER *Muscicapa hypoleuca*

G. Single females, Shirehampton, Bristol, May 2 (K.B.Y.) and Combe Dingle, Westbury-on-Trym on 22nd (I.H.S.). Male, Cattybrook, Almondsbury, Aug. 28 (H.W.N.).

S. Single males, Weston Woods, Apr. 21 (R.A.); Kewstoke, May 15 (K.B.Y.).

MEADOW PIPIT *Anthus pratensis*

S. Steep Holm, Sept. 23–Oct. 7: fair size movement in progress, especially from 23rd to 26th when at least 1,300 passed island heading S.E.—E.S.E. (Res. Stn.).

TREE PIPIT *Anthus trivialis*

S. Noted in breeding season at Leigh Woods, Ashton Court, Blackdown and Yoxter (Mendip), and Cheddar Gorge (various observers).

ROCK PIPIT *Anthus spinoletta petrosus*

G. Minimum of 30 wintering on coast, Severn House Farm, nr. Berkeley, to Aust (J.D.R.V.).

S. Approx. 20, Sand Bay, Feb. 18 (W.L.R.). Reservoirs: one, Cheddar, Feb. 26 (M.G.W.), Mar. 4 (R.M.C.); two, Chew Valley, Mar. 4 (B.K.), Oct. 13 (G.L.B.); and one, Barrow Gurney, Nov. 11 (K.B.Y.).

WATER PIPIT *Anthus spinoletta spinoletta*

S. One, Chew Valley res., Jan. 8–Mar. 5; three, Mar. 18–Apr. 1 and at least four (possibly ten), Apr. 24 (R.S.H., B.K. *et al.*). Up to four, same place, Oct. 13–Dec. 14, with nine (possibly 14), Nov. 19 (R.M.C., M.G.W. *et al.*). Single birds, Cheddar res., Mar. 12, 19 and again from Oct. 30–end Dec., but three, Nov. 18, Dec. 17 (J.A.McG., G.S. *et al.*).

PIED WAGTAIL *Motacilla alba yarrelli*

G. Juvenile ringed (AA40357), Moorend, Winterbourne, nr. Bristol, 23/6/60, found dead 35m. E.S.E., Pewsey, Wilts, 20/5/61 (R.H.P.).

GREY WAGTAIL *Motacilla cinerea*

G. Present throughout year, R. Boyd, Wick—up to four in spring and summer (D.R.H.).

S. Breeding reported from Barrow Gurney resrs., Stanton Drew, Midford, nr. Bath and Shipham. Single migrants, Steep Holm, Oct. 1, 3 (Res. Stn.). One at bird table in very cold weather, Chilcompton, end Dec. (R.S.H.).

YELLOW WAGTAIL *Motacilla flava flavissima*

S. One, Chilcompton on late date of Oct. 30 (R.S.H.).

STARLING *Sturnus vulgaris*

G. and **S.** Roost sites in City of Bristol include St. Mary Redcliffe Church spire, plane trees (while still in leaf in late summer) along R. Avon, underneath Bristol Bridge (road bridge over docks) and under railway bridge over Avon nr. Temple Meads Station (P.J.C.). Two pairs bred, Steep Holm (Res. Stn.). Ringing recoveries include two ringed (as full grown) in garden, Eastville, Bristol by M.J.B. :—

V13361, 7/2/60 : nr. Paderborn, Nordrhein-Westfalen, Germany, 25/6/61.
V13306, 10/1/60 : 185m., E.N.E., Beccles, Suffolk, 22/1/61.

HAWFINCH *Coccothraustes coccothraustes*

G. One in hawthorn hedge, New Grounds, Dec. 31 (L.P.A.).

S. Party of five, Leigh Woods, Apr. 17: nest with 3 eggs, same place, June 8 (P.J.C.).

GREENFINCH *Chloris chloris*

S. Recoveries of birds ringed on Steep Holm:—

S 72951 F-G, 30/10/59 : Penarth, Mon., 7m. N.N.W., 11/4/61.
S 72955 1stW. 30/10/59 : Portishead, Som., 16m. N.E., 22/4/61.
79211 × Ad.♀ 15/4/61 : nr. Ulverston, Lancs., 196m. N., c.25/4/61.

GOLDFINCH *Carduelis carduelis*

S. Full-grown ♀ ringed (AB55826), Pensford, 22/5/61, recovered, St. Magne nr. Castillon (Gironde) France, 25/12/61 (D.M.C.).

SISKIN *Carduelis spinus*

G. One, New Passage, Nov. 1 (R.A.).

S. Many records from coastal and inland localities of up to five birds (various observers) with max. of 14, Sand Point, Oct. 14; over 30, Wick St. Lawrence on 15th (T.B.S.) and 18, Saltford, Dec. 5 (P.H.).

LESSER REDPOLL *Carduelis flammea cabaret*

G. Up to three, New Grounds, Sept. 14–Nov. 17 (L.P.A.).

S. One, Sand Bay, Dec. 31 (R.A.).

SERIN *Serinus canarius*

G. Male feeding on thistles in W.T. enclosures, New Grounds, July 13, 16 (L.P.A.). Detailed plumage notes submitted include: olive-brown crown and mantle with darker streaks; dark grey-brown eyestripe and yellow superciliary; rich yellow forehead, sides of neck, throat and breast becoming paler yellowish-white in ventral region; bright greenish-yellow rump—very noticeable when bird flew off; brownish-olive wings with two sepia wing bars; darker brown tail; dark legs; short, conical, pale brown bill. A small, compact bird, its size being hardly larger than a nearby Willow Warbler. Record (first for Bristol Area and Gloucestershire) accepted by *Brit. Birds* Rare Birds Committee.

BULLFINCH *Pyrrhula pyrrhula*

G. and **S.** As a result of large breeding population in 1960 and mild winter, numbers reached a high level in 1961. Reports of increased numbers from: **G.**—Vale of Berkeley and Moorend, Winterbourne, nr. Bristol; and **S.**—Bath, Saltford, Chew Valley area, Litton, Blagdon and Shipham.

CHAFFINCH *Fringilla coelebs*

S. Of 260 ringed in Bristol Area during 1961, two ad.♀♀, both ringed Jan. 15, recovered abroad:—

AB20560, Clapton-in-Gordano : Vourenmaa nr. Köylio (Turku-ja-Poira), Finland, Apr. 16 (R.F.T.).
E89388, Saltford : Lütjenburg, nr. Plön (Schleswig Holstein), Germany, Sept. 19 (M.A.W.).

CORN BUNTING *Emberiza calandra*

G. Two males, Acton Turville—Tormarton road, May 13 (J.D.R.V.) and single bird nr. Old Sodbury, June 16, July 4 (B.C.). **S.** Single male, Yoxter (Mendip), Apr. 30, May 23 (P.J.C., M.A.W.). Three, Saltford, May 11 (B.K., W.J.S.).

CIRL BUNTING *Emberiza cirlus*

G. and **S.** Noted in breeding season at: **G.**—Shirehampton; and **S.**—Portishead, Wraxall, Worle, Shipham and in Axbridge–Cheddar area.

ORTOLAN BUNTING *Emberiza hortulana*

S. Adult male seen at distances down to 10 yards, Brean Down, Sept. 10 by C.B. and R.E.H. who have supplied a full description: brownish green-grey head and nape, crown faintly streaked darker green; vivid cream moustachial stripe and white orbital ring; streaked milk-chocolate brown-black scapulars and back; light yellow-brown chin and throat; dull yellow breast tinged with green; pink bill and flesh coloured legs. First record for Bristol area and Somerset.

SNOW BUNTING *Plectrophenax nivalis*

S. Sand Bay: three, Feb. 5, two from 12th to Mar. 1 and one on 10th; single birds, Brean Down, Mar. 12, 22, and Uphill, Apr. 14. Single birds in autumn, Weston Bay, Sand Bay and Yeo Estuary, Oct. 15, and up to five present subsequently; two, Cheddar res., Nov. 25 (various observers).

TREE SPARROW *Passer montanus*

G. Breeding reported from Wick (D.R.H.) and Moorend, Winterbourne (R.H.P.).

S. Bred in Emborough—Chewton Mendip area and Downside (R.S.H.), and nr. Chew Valley res. (W.J.S.). Also noted in breeding season, Yatton Moor, Kenn Moor and Kingston Seymour (H.H.D. *et al.*) and Saltford Sewage works where 28 caught and ringed, Jan.–Sept. (P.J.C., M.A.W.).

SPECIES REPORTED DURING THE YEAR BUT NOT INCLUDED IN THE SYSTEMATIC LIST:—

Residents: Pheasant, Moorhen, Tawny Owl, Kingfisher, Green Woodpecker, Great Spotted Woodpecker, Carrion Crow, Rook, Jackdaw, Jay, Great Tit, Marsh Tit, Wren, Song Thrush, Blackbird, Hedge Sparrow, Linnet, Yellow Bunting, Reed Bunting, House Sparrow.

Summer or Winter Visitors and Passage Migrants: Whimbrel, Dunlin, Common Gull, Black-headed Gull, Cuckoo, House Martin, Fieldfare, Wheatear, Whinchat, Redstart, Nightingale, Sedge Warbler, Garden Warbler, Wood Warbler, Spotted Flycatcher, White Wagtail, Brambling.

LEPIDOPTERA NOTES
BRISTOL DISTRICT, 1961

By C. S. H. Blathwayt

A VERY mild Winter was followed by an early Spring. The weather during the Summer and Autumn was somewhat better than usual and the year ended with an especially cold December.

The year was not a good one for Butterflies but was better for Moths, particularly in the Autumn.

The following notes are taken from records supplied by J. F. Burton (J.F.B.) and K. H. Poole (K.H.P.) and also from my own records.

Pieris rapae Linn. (Small Garden White). One seen at Milton, near Weston-super-Mare, March 8 (K.H.P.).

Thecla quercus Linn. (Purple Hairstreak). A larva found at Ashton Park, May 9 (J.F.B.).

Tethea ocularis Linn. (*octogesima* Hübn.) (Figure of Eighty). A few at light at Weston in June.

Panaxia dominula Linn. (Scarlet Tiger). Larvae found at Nympsfield (Glos.) on May 6; moths emerged from June 9.

Amathes ditrapezium Borkh. (Triple-spotted Clay). A few at light at Shapwick, July 21.

Hadena bombycina Hufn. (*glauca* Hübn.) (Glaucous Shears). One at light at Weston, May 14.

Apamea furva Hübn. (Confused Brindle). One at light at Weston, July 22.

Apamea unanimis Hübn. (Small Clouded Brindle). One at light at Weston, June 17 and another at Shapwick, July 21.

Dypterygia scabriuscula Linn. (Bird's Wing). One at light at Milton, June 14 (K.H.P.).

Antitype flavicincta Fabr. (Large Ranuncle). One at light at Langport, Sept. 17 (J.F.B.). Fairly common at light at Weston during September.

Antitype chi Linn. (Grey Chi). One at rest near Cheddar, August 21.

Leucania vitellina Hübn. (Delicate Wainscot). One at light at Weston, Sept. 17.

Orthosia advena Schiff. (*opima* Hübn.) (Northern Drab). One at light at Weston, April 18.

Heliothis armigera Hübn. (Scarce Bordered Straw). One at light at Weston, Oct. 14.

Sterrha trigeminata Haw. (Treble-spot Wave). Several at light at Weston during June.

Cosymbia puppillaria Hübn. (Blair's Mocha). One at light at Weston, Oct. 5.

Colostygia salicata Hübn. (Striped Twin-spot Carpet). One at light at Weston, Aug. 7.

Larentia clavaria Haw. (*cervinata* auct.) (Mallow Carpet). One at light at Milton, Sept. 18 (K.H.P.), and another at Weston, Oct. 2.

Entephria caesiata Schiff. (Grey Mountain Carpet). One at light at Weston, July 11.

A NOTE ON COASTAL EXPERIMENTS WITH FLUORESCENT TRACERS

By W. J. Reid and I. P. Jolliffe
(Hydraulics Research Station, Wallingford)

In a paper on "Beach Drift Experiments at Bridgwater Bay" (Kidson and Carr, 1961), reference is made to a recent paper (Reid and Jolliffe, 1961) on coastal experiments carried out by the Hydraulics Research Station of the Department of Scientific and Industrial Research with the aid of fluorescent-tracer pebbles. In the paper by Dr. Kidson and Mr. Carr it is suggested that three basic assumptions had been made in the development of the "Tracer Concentration Method", and that these assumptions were incorrect. The assumptions mentioned were:

(1) that all pebbles, irrespective of size or position on the beach, move at the same rate;

(2) that the net drift pattern between any two injections of tracer material is the same as the general pattern over the whole year; and

(3) that the movement of material is constant and in one direction only.

We would like to point out that we are, of course, aware that the first two of these assumptions do not accurately describe the movements of pebbles on a beach; however, these assumptions had to be made so that a theoretical model of the movement of tracer material could be related to the movement of material on a beach. The experiments carried out by the Hydraulics Research Station showed that, even though these assumptions were necessary, the Tracer Concentration Method could give a reliable figure for the net drift on a pebble beach. This is demonstrated by the results for the western beach at Rye, where the actual drift over one year was measured as 60,000 tons, and found by the Tracer Concentration Method to average about 73,000 tons.

The third stated assumption was not made in our paper. The whole point of the Tracer Concentration Method is that it can be used on beaches where the drift is sometimes along the beach in one direction, sometimes in the other direction; this point is clearly stated in the paper, and the curves given there in Fig. 1

show how the tracer material moves under varying conditions of drift.

We would like to add that since our paper was written the Hydraulics Research Station have carried out further experiments on the relative rates of movement of pebbles of different sizes. These experiments have demonstrated that with medium waves on a beach large pebbles move faster than small pebbles, while with small waves the small pebbles can move faster than the large pebbles. Under medium wave conditions the average rate of movement of large pebbles (3 in. long axis) was 450 ft. in 16 days; the average rate of movement of small (less than 1 in. long axis) pebbles was about 200 ft. in 16 days. A description of these experiments will shortly be published in *Hydraulics Research 1961*.

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RHAETIC EXPOSURE AT EMBOROUGH

By R. J. G. Savage
(Dept. of Geology, University of Bristol)

During March 1961, road work at Old Down, Emborough, Somerset, revealed a complete succession in the Rhaetic which is here recorded.

The A37 road between the railway bridge south of Old Down (National Grid Reference ST626509) and the Old Down Inn (ST625513) has been recut just west of its present position. On the west margin of the new track the cut has been deepened 5 feet to take a drain. The section as seen on March 27th 1961 displayed a continuous temporary exposure of 85 yards length. Detailed fossil collecting was impossible in the short time available, but enough was obtained to establish clearly the succession (Table 1).

TABLE 1. SUCCESSION IN OLD DOWN ROAD CUTTING

STRATA		DESCRIPTION OF BEDS	THICKNESS	
			Feet	Inches
Langport	18	White thickly bedded limestone (White Lias)	1	6
	17	Rubbly limestone	2	0
Cotham	16	Yellow-brown clay	0	2
	15	Cotham Marble (Landscape variety) ...	0	6
	14	Green-grey shaly marl with 2 inch limestone band	4	0
	13	Grey banded marl	1	0
	12	Grey limestone	0	6
	11	Grey marl	1	0
	10	Grey-white limestone	0	2
Westbury	9	Black shale with calcareous mudstone ...	2	0
	8	Black shale, weathering grey with yellow ochreous patches	2	0
	7	Hard calcareous shelly sandstone	0	3
	6	Alternating thin beds of sandstone and shale	1	6
	5	Yellow-brown decalcified sandstone crowded with molluscan moulds	0	1
	4	Black clayey shale with sandstone partings and 1 inch beef bed near top	3	0
	3	Black shale and calcareous micaceous sandstone in thin alternating beds	1	0
	2	Calcareous sandstone	0	1
	1	Bone Bed	0	5
Trias		Tea Green Marl with 3 inch marly sandstone bed near top ... ... [Red Marl]	7+	

Red Marl can be seen near the railway bridge while at the beginning of the new cut the Tea Green Marls are exposed. These are followed by a nodular quartz pebble conglomerate, the basal bone bed of the Rhaetic (1), rich in fish remains: the bed occurs in nodules up to two feet across and up to 5 inches deep. The pebbles in the nodules range up to 6 inches diameter and are well worn and set in a fine quartz matrix with phosphatic inclusions. No andesite or Carboniferous Limestone pebbles were found and pebbles of Trias Marl were not numerous. The Bone Bed is succeeded by a thin calcareous sandstone (2), coarse in patches and containing phosphatic nodules and rolled vertebrate remains. Above this is a series (3) of grey-black shales alternating with thin bands of fine-grained calcareous micaceous sandstone, current-bedded and with ripple marks and worm tracks. Both the shale and sandstone contain vertebrate remains, lignite occurs in the shale and streaks of crystalline sphalerite are present in the sandstone. Bed (4) is more predominantly a clayey shale with subordinate sandstone partings and a one inch beef band near the top. The thin yellow-brown decalcified sandstone (5) is crowded with molluscan moulds though the poor preservation admits only two identifiable species. The succeeding black shales are rich in bivalves and the hard calcareous sandstone bed (7) has numerous lightly pyritized fossils.

The Cotham beds commence with a grey-white thinly bedded limestone (10) which is crowded with fragments of vertebrates, mainly fish scales together with a few molluscans. The succeeding marls and shales did not yield fossils and are capped by 6 inches of Cotham Marble. Nodules of the marble up to 3 feet diameter were seen in the tips from the road cutting while *in situ* smaller ones were recorded. The marble displays clearly the 'landscape' features, some nodules having two tiers of 'woods': the top surface of many nodules was botryoidal and the sides markedly corded. No 'Crazy Cotham' was recorded. A thin clay band separates the Cotham Marble from the overlying Langport Beds; these comprise rubbly limestones below, rich in molluscan moulds, and white flaggy limestone above. About 18 inches of the latter was seen below the subsoil.

The species list (Table 2) shows that the fauna is almost exclusively a fish and bivalve assemblage. No reptilian remains were found and there are no associated fish remains, the finds comprising isolated teeth, scales and spines. Fish scales are abundant at several levels and where identifiable can be referred to *Gyrolepis*. Small *Nemacanthus* spines occur at three levels and the other species listed are represented by abundant teeth. The molluscs are poorly

TABLE 2. SPECIES FROM THE RHAETIC OF OLD DOWN

Species	Beds							
	1	2	3–4	5	7	8–9	10	17
Bivalves								
?Astarte					*			
Cercomya praecursor (Quenstedt)						*		
Chlamys valoniensis (de France)							*	
"*Isocyprina*" *ewaldi* (Bornemann)				*	*			
Lima (*Plagiostoma*) *praecursor* Quenstedt ...					*			
Modiolus hillanus (J. Sowerby)								*
Pleuromya tatei Richardson & Tutcher ...								*
Protocardia rhaetica (Merian)					*			
Rhaetavicula contorta (Portlock)			*			*		
Unionites? liasinus (Roemer)				*	*	*		
Fish								
Acrodus minimus Agassiz	*	*	*					
Hybodus cloacinus Quenstedt	*	*						
Nemacanthus monilifer Agassiz			*		*			
Gyrolepis alberti Agassiz	*	*	*		*	*	*	
Sargodon tomicus Plieninger	*	*						
Saurichthys acuminatus Agassiz	*	*	*					

preserved, usually as moulds or pyritized. Some bedding planes in the Westbury beds are crowded with small elliptical impressions, the so-called 'Pullastra' beds; Dr. L. R. Cox considers these shells should be referred to the genus *Unionites* Münster, more commonly known by the pre-occupied name *Anoplophora* Alberti. *Modiolus hillanus* has long been referred to in this country as *M. langportensis* Richardson & Tutcher.

The beds are horizontal throughout and there is no trace of the disturbance recorded by Woodward (1876) half a mile to the east, where the Rhaetic is down-faulted against the Dolomitic Conglomerate and folded into a small syncline; the section as recorded by Woodward has a thicker succession in the Westbury Beds (Table 3).

TABLE 3. RHAETIC SUCCESSIONS AS RECORDED IN VICINITY OF EMBOROUGH

SITE and	Chilcompton Railway Cutting	Emborough Ochre Pit	Emborough Fullers' Earth Works	Old Down Road Cutting
AUTHOR	Woodward 1876	Morgan & Reynolds 1899	Richardson 1911	(described above)
LANGPORT BEDS	10′ approx.	—	—	3′ 6″
COTHAM BEDS		3′	4′ 10″	7′ 4″
WESTBURY BEDS	18′	12′ 1″	10′ 7″	10′ 4″
TEA GREEN MARLS	12′ 6″	10′	10′	7′+

Lloyd Morgan & Reynolds (1899) record Rhaetic exposed in the Emborough Ochre Pits, about half a mile south-west of the Old Down Inn. Neither Woodward nor Lloyd Morgan and Reynolds noted the Cotham Marble *in situ*, but Richardson (1911) includes it in his section for Emborough. Being a nodular rather than a continuous bed it is easy to miss it in small sections.

I acknowledge the help in the field of Mr. T. R. Fry and Mr. M. E. White who collected fossils while I recorded the section, and I am indebted to Dr. L. R. Cox for kindly identifying the molluscs.

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SOME NOTES ON THE RHAETIC SEDIMENTS OF THE FILTON BY-PASS SUBSTITUTE, NEAR BRISTOL

By D. Hamilton

(Department of Geology, University of Reading)

INTRODUCTION

THE construction of the Filton By-Pass Substitute (Grid Ref. ST797570 to ST835606) has exposed three fine sections of Rhaetic rocks. These were examined during the summer and autumn of 1961. As most of the exposures will be grassed over when the road is completed, this paper is a record, albeit incomplete, of sedimentary features in the Rhaetic sequence.

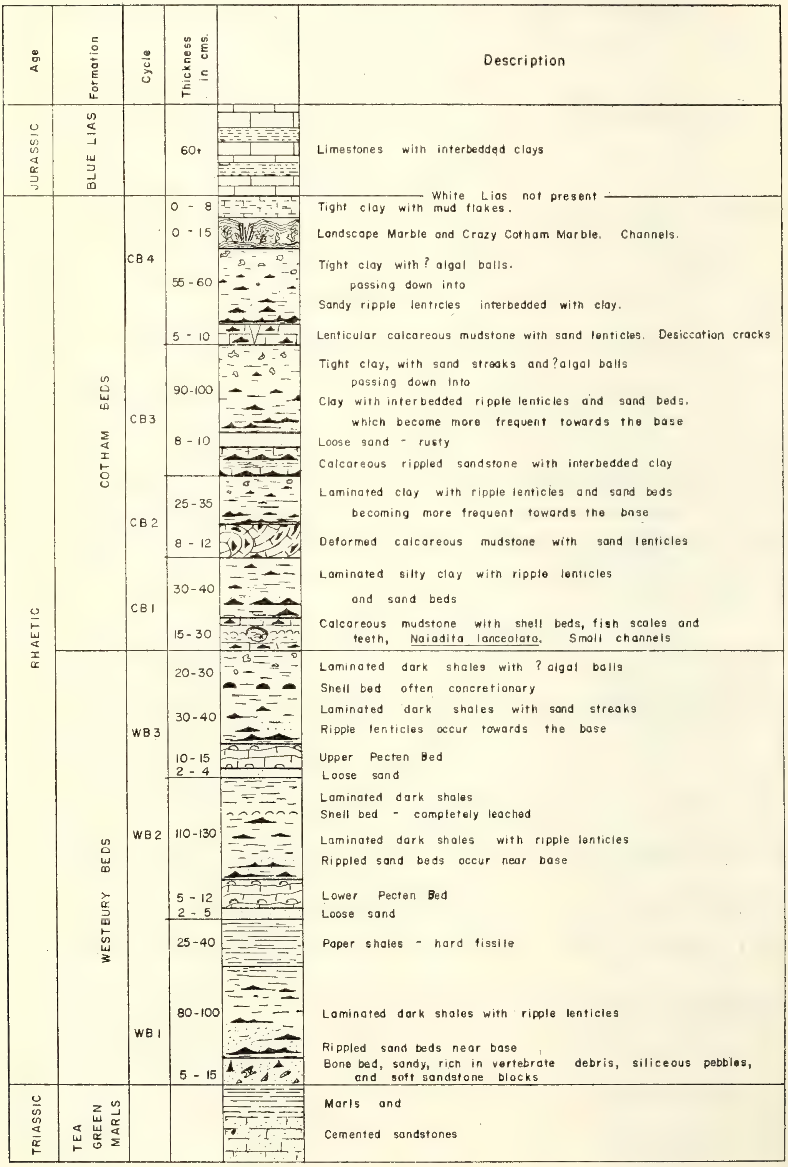
The stratigraphical sequence (Fig. 1) is generally similar to that of other Rhaetic sections in the Bristol area, but there are local variations in both the lower Westbury Beds and the upper Cotham Beds. The distribution of these beds is shown on the map (Fig. 2), and for ease of reference the chainages along the road are indicated. Sections exposing Rhaetic rocks extend from chainages 36 to 73, 98 to 110 (good section) and 142 to 180.

THE WESTBURY BEDS

The basal Bone Bed, overlying the Tea Green Marls, is dominantly sandy, in contrast to the large blocky conglomerate present at this horizon at Aust. At 75ch., the top of the Tea Green Marl appears to have been eroded and is followed by 35 cm. of coarse friable sand with pebbles and vertebrate debris, interbedded with clayey sand. At 110ch., abundant vertebrate debris and pebbles set in a calcareous, sandy clay matrix fill small depressions in the Tea Green Marl surface. Pebble types in the Bone Bed include angular to sub-angular cherts and siliceous sandstones, well rounded vein and metaquartzite pebbles (?gastroliths, Wickes, 1908), and at 36ch. to 38ch., small blocks (up to 10 cm.) of poorly cemented sandstone, which appear to be intraformational. The presence of soft blocks, the mixture of aquatic and terrestrial vertebrate debris (Dr. B. Tarlo, pers. comm.), the very poor sorting, and its stratigraphical position support the interpretation that this bed, in the Bristol area, was deposited in a transgressive littoral zone (Donovan, 1955, p. 25).

Fig. 1.

STRATIGRAPHICAL SUCCESSION OF THE RHAETIC SEDIMENTS
FILTON BY-PASS SUBSTITUTE



Age	Formation	Cycle	Thickness in cms.		Description
JURASSIC	BLUE LIAS		60+		Limestones with interbedded clays
					White Lias not present
RHAETIC	COTHAM BEDS	CB 4	0 - 8		Tight clay with mud flakes.
			0 - 15		Landscape Marble and Crazy Cotham Marble. Channels.
			55 - 60		Tight clay with ? algal balls. passing down into Sandy ripple lenticles interbedded with clay.
			5 - 10		Lenticular calcareous mudstone with sand lenticles. Desiccation cracks
		CB 3	90-100		Tight clay, with sand streaks and ? algal balls passing down into Clay with interbedded ripple lenticles and sand beds, which become more frequent towards the base
			8 - 10		Loose sand - rusty Calcareous rippled sandstone with interbedded clay
		CB 2	25 - 35		Laminated clay with ripple lenticles and sand beds becoming more frequent towards the base
			8 - 12		Deformed calcareous mudstone with sand lenticles
		CB I	30 - 40		Laminated silty clay with ripple lenticles and sand beds
			15 - 30		Calcareous mudstone with shell beds, fish scales and teeth, *Naiadita lanceolata*, Small channels
	WESTBURY BEDS	WB 3	20 - 30		Laminated dark shales with ? algal balls Shell bed often concretionary
			30 - 40		Laminated dark shales with sand streaks Ripple lenticles occur towards the base
			10 - 15		Upper Pecten Bed
			2 - 4		Loose sand
		WB 2	110-130		Laminated dark shales Shell bed - completely leached Laminated dark shales with ripple lenticles Rippled sand beds occur near base
			5 - 12		Lower Pecten Bed
			2 - 5		Loose sand
		WB I	25 - 40		Paper shales - hard fissile
			80-100		Laminated dark shales with ripple lenticles Rippled sand beds near base
			5 - 15		Bone bed, sandy, rich in vertebrate debris, siliceous pebbles, and soft sandstone blocks
TRIASSIC	TEA GREEN MARLS				Marls and Cemented sandstones

The beds overlying the Bone Bed are dominantly argillaceous and contain two limestone horizons known as the Upper and Lower Pecten Beds. Above the Bone Bed, the shales are interbedded with numerous thin rippled sand beds. These decrease in thickness and frequency upwards, giving way to ripple lenticles before the appearance of the Paper Shales, which underlie the Lower Pecten Bed. The interbedded shales have fine sandy laminae throughout, though those in the Paper Shales are only a few grains thick. Thus not only is there a decrease in the frequency and thickness of the sandstone bands but also in the proportion of the sandy fraction in the shales.

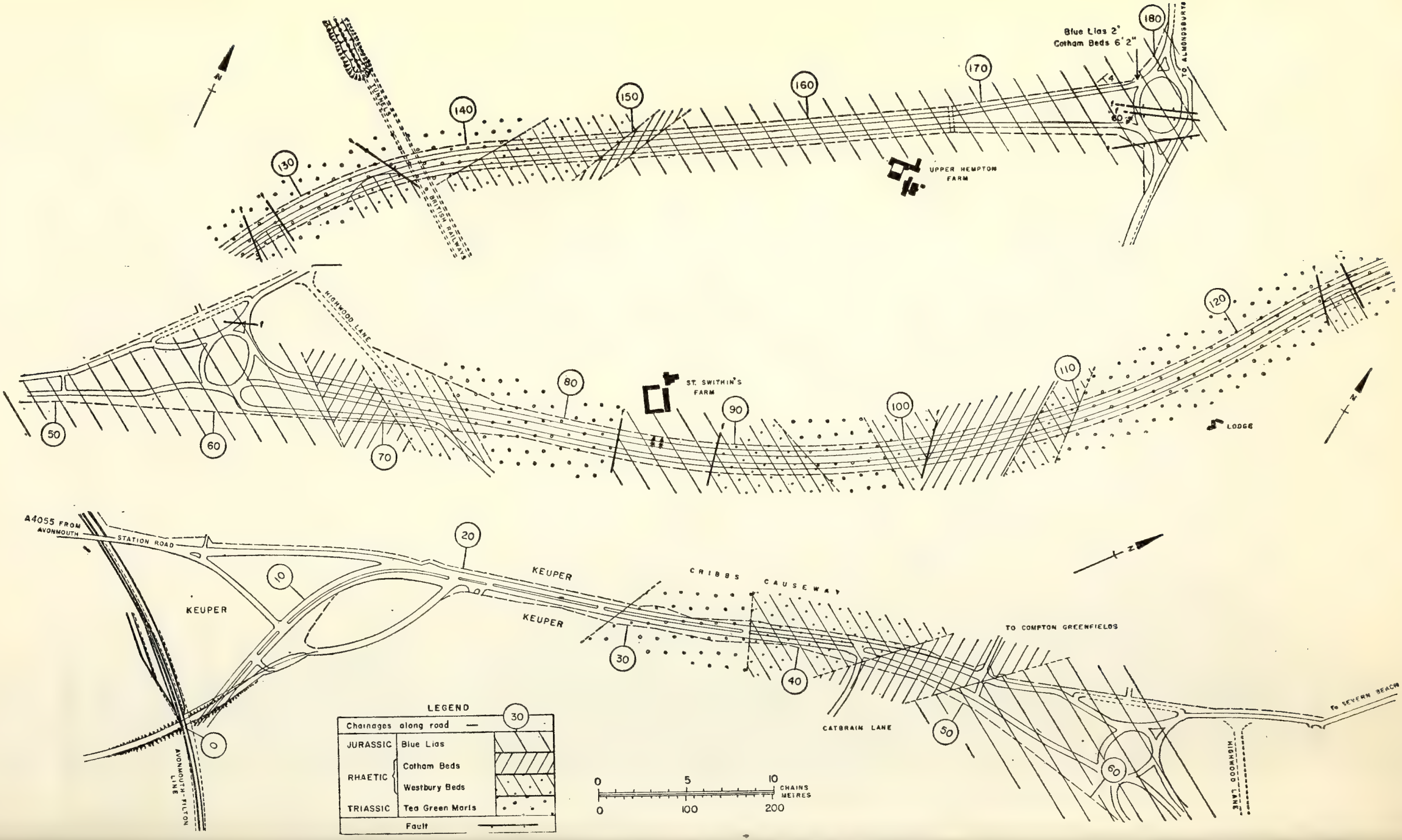
The incoming of both the Lower and Upper Pecten Beds is abrupt, following a thin bed of loose sand. These dark limestones consist mainly of shells and shell fragments, with dark organic material and muddy lenses. Complete but disarticulated shells, mostly of *Pecten valonensis*, are common on the upper and lower surfaces, but the interior of the limestone is extensively recrystallised. The limestones appear to be either current concentrated shell beds or shell banks subjected to current action. The Upper Pecten Bed lenses out at 67ch. and it is likely that the Lower Pecten Bed is also lenticular. Above each limestone are thin beds of loose coarse sand, followed by a sequence of laminated shales and interbedded sands and ripple lenticles, similar to those of the underlying sequence.

Here the Westbury Beds comprise three repetitions of sedimentary features. Each cycle starts with a wave or current concentrated deposit, usually calcareous and with abundant fossils. Upwards in the cycle, the rocks become increasingly more argillaceous.

THE COTHAM BEDS

The contact between the Westbury and Cotham Beds is sharp. There are small scale erosional irregularities on the shale surface and rolled lumps of Westbury Beds occur in the base of the Cotham Beds (180ch.). The Cotham Beds, though they are more calcareous than the Westbury Beds, also show cycles of sedimentation. Four cycles or minor cyclothems can be distinguished (Fig. 1). The features of a cycle are, briefly: (1) a basal calcareous horizon, above which there is usually a gradual reduction in the amount of carbonate, (2) shell or sand beds, or ripple lenticles, most common near the base of a cycle but which decrease in frequency upwards, (3) an increase in the proportion of clay upwards in each cycle. Local variations however are common.

The basal calcareous horizons of the first, second and fourth



Blue Lias 2'
Cotham Beds 6' 2"
TO ALMONDSBURY
180
170
160
150
140
130
4
60
UPPER HEMPTON FARM
TUNNELS
BRITISH RAILWAYS
N
HIGHWOOD LANE
ST. SWITHIN'S FARM
LODGE
50
60
70
80
90
100
110
120
N
A4055 FROM AVONMOUTH
STATION ROAD
KEUPER
KEUPER
KEUPER
CRIBBS CAUSEWAY
TO COMPTON GREENFIELDS
CATBRAIN LANE
HIGHWOOD LANE
TO SEVERN BEACH
AVONMOUTH-FILTON LINE
N
0
10
20
30
40
50
60
LEGEND
Chainages along road 30
JURASSIC Blue Lias
RHAETIC Cotham Beds
Westbury Beds
TRIASSIC Tea Green Marls
Fault
0 5 10 CHAINS
0 100 200 METRES

Fig. [illegible] Geological map of Filton By-Pass Substitute cycles have argillaceous bands interbedded with sand beds, sand ripple lenticles, or shell and organic debris deposits. All show evidence of deposition under fluctuating current conditions, yet each of the limestones has distinctive features.

The basal horizon of the first cycle has numerous shell beds, often filling shallow channels up to 10 cm. wide and in places (180ch.) colonised by algae. The algae include encrusting and small branching forms. Rippled sand beds become more common higher in the horizon and these give way to sand lenticles. Small channel structures remain common throughout. Some bedding planes are crowded with fish teeth, scales and vertebrae, and others with ostracods. Many of the finer grained beds, between 5 and 15 cm. above the base, are strewn with fragments of *Naiadita lanceolata.*

In the base of the second cycle, sand lenticles interbedded in calcareous mudstone are profuse. Almost throughout its length of outcrop, this rock shows small scale flow folds (Pl. VI, 1) formed before the sediments were consolidated. The deformation is confined to this horizon and the folds lack a strong directional component in the outcrops seen.

The base of the third cycle is characterised by the dominance of sand over carbonate and consists of calcite cemented medium sands. Oscillation ripples are ubiquitous, usually showing internal evidence of migration, and some sets of ripple directions lie at right angles to those on adjacent bedding planes. The undersurfaces of the cemented sands have casts of trails, dragmarks, runnels, pits, desiccation cracks and small mud lumps—these features having formed on, or in, the thin interbedded clays.

The fourth calcareous horizon is often lenticular and concretionary. It is cut by a number of vertical cracks, up to 15 cm. deep, 3 cm. wide at the top and which taper downwards. They form a polygonal pattern, some polygons measuring 60 cm. across but most are smaller than this. The cracks, now filled with small shell fragments, coarse and fine sand, and clay (Pl. VI, 2), are interpreted as deep desiccation cracks. Early shrinkage jointing has probably facilitated the formation of small sedimentary dykes between ripple lenticles on the left of the main crack in the specimen. Later sinuous shrinkage cracks are lined with clear calcite, or sometimes with pale blue celestite.

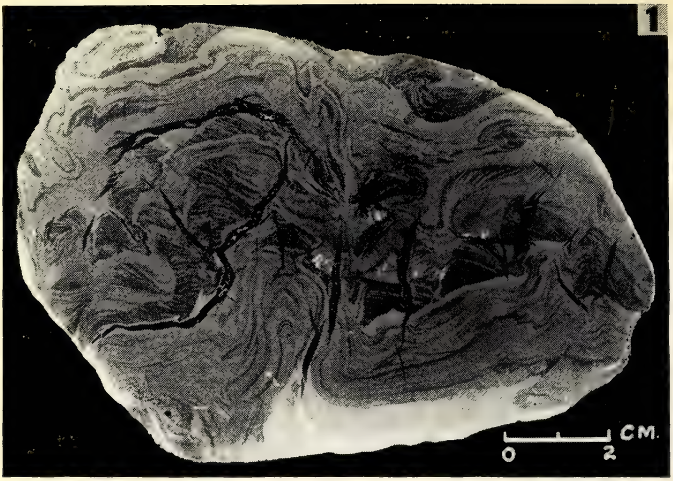
Each of the calcareous horizons is overlain by sandy oscillation ripples or lenticles interbedded with silty clay. The sand ripples are usually cemented with calcite and often show the casts of trails on their undersurface. These beds pass up into clays with fine sand streaks. In the upper clays, irregular calcareous "balls" occur (Pl. VI, 3), these being abundant at 65 to 70ch. and 104 to 108ch. The upper surfaces of some of these balls are locally perforate, and the interior and undersides are profusely cracked as if by shrinkage. The cushion shapes suggest growth on bedding planes, whilst the tiered shapes suggest upward growth as a result of deposition of sediment, lateral extension taking place during pauses in deposition. These structures are tentatively interpreted as algal balls. They also occur in the top 30 cm. of the Westbury Beds at 180ch. and have been noted in the clay horizons of both the Westbury and Cotham Beds at places in the Aust Cliff.

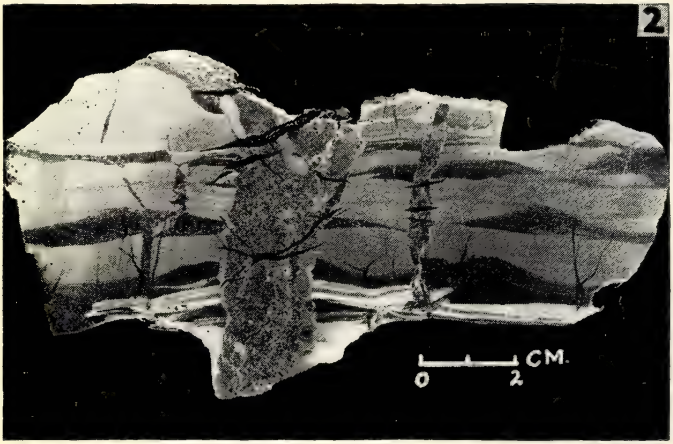
During the road construction work, sizeable areas of Landscape Marble were uncovered. It was possible to observe that: (*a*) the algal bioherms (Hamilton, 1961) almost always occur on the same level within the uppermost clay of the top cycle, (*b*) rarely some bioherms were overturned (179ch.), (*c*) channelling is most evident at this horizon, (*d*) mud flakes are concentrated in the channels (Crazy Cotham Marble) as well as in the depressions between, and on top, of the algal masses, (*e*) very frequently the algae colonised small shell banks, channel fills and sedimentary mounds, and (*f*) both the algal bioherms and channel deposits are strongly cemented with calcite, contrasting with the enclosing clay. Generally 2 to 8 cm. of clay with flakes separate the Landscape Marble from the overlying Blue Lias, but at 55ch. Blue Lias limestone wraps directly over Landscape Marble.

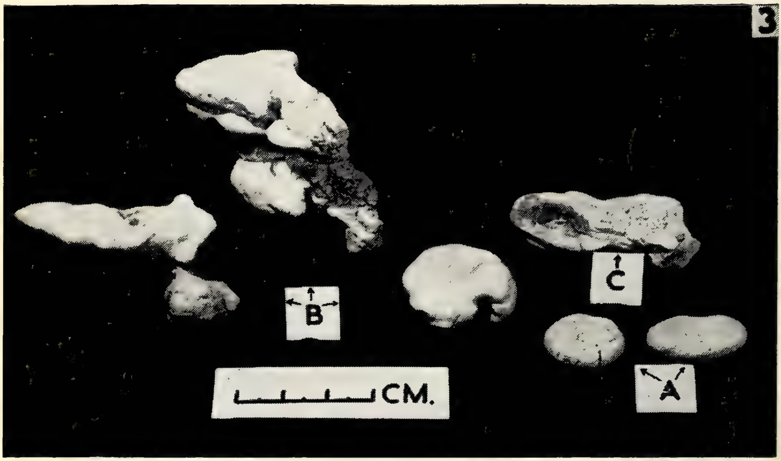
DISCUSSION

There is a close similarity between the sequences at Aust and the Filton By-Pass Substitute, but they are not identical. Even within the length of the Filton road works there are differences in thickness and detailed sequence. This is to be expected in a very shallow water suite with evidence of repeated exposure and local erosion. However, the repetition of sedimentary features does suggest that both the Westbury and Cotham Beds are each comprised of several cycles, or minor cyclothems.

The basal bed of each cycle was deposited under conditions of greatest energy, *i.e.* current and/or wave action, with a gradual reduction of energy input from the environment as the cycle progressed. Such conditions could have been caused by relatively small oscillations of the strand line, and probably there were associated changes in the nature of materials received from the source area. Hallam (1961, 159) has pointed out that the Rhaetic sequence can be considered as a cyclothem, with shales dominant in the lower portion (Westbury Beds), passing into marls (Cotham







[*face p. 285.*

Beds) and limestones (White Lias) at the top. It is interesting to note that this lithological sequence is virtually reversed in the small cycles described in this paper. Since the completion of fieldwork, it has been learned that Mr. H. C. Ivimey-Cook, B.Sc., (Geological Survey), has recognised cycles in the occurrence of fossils in the Rhaetic sequence in east Glamorgan (pers. comm.).

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Explanation of Plate

Plate VI, 1. Penecontemporaneous folding in the calcareous horizon at the base of cycle CB2, Cotham Beds. From 179ch. Negative print of acetate peel from S12,001, Reading University Geology Dept. Catalogue.

Plate VI, 2. Deep desiccation crack (middle), filled with sand and clay, in calcareous mudstone with sand lenticles, at the base of cycle CB4, Cotham Beds. Small sand dyke on left of main crack. Late shrinkage cracks (black) filled with calcite. From 179ch. Negative print of acetate peel from S12,002.

Plate VI, 3. Possible algal balls from uppermost clay of cycle CB4, Cotham Beds. A. Cushion shape—growth on a bedding plane. B. Tiered shape—upward growth during deposition of sediment, lateral growth during pauses in sedimentation. C. Shrinkage cracks on underside and inside. From 105ch. S12,003.

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VOLUME XXX, PART IV, 1962

CONTENTS

	PAGE
Council	288
New Members and Changes of Address	289
Report of Council	292
Report of Entomological Section	292
Hon. Treasurer's Statement of Accounts	293
Report of Botanical Section	294
Report of Geological Section	295
Report of Ornithological Section	296
Account of the General Meetings	297
Hon. Librarian's Report	298
Obituary: J. H. Savory	299
Bristol Botany in 1962, by N. Y. Sandwith	301
Bristol Bird Report, 1962	309
Lepidoptera Notes, Bristol District, 1962, by C. S. H. Blathwayt and J. F. Burton	335
Centenary Celebrations, by F. Coles Phillips and A. J. Willis	339
Plant Communities on Shapwick Heath, Somerset, by J. F. Hope-Simpson, Sarah E. Newton and M. J. Ricketts	343
Occurrence of Illite in the Gully Oolite of the Avon Gorge, by R. J. Howarth	363

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	Morgan, H.	Dodmore Crossing, Westerleigh, nr. Bristol
	Morgan, Miss V.	305 New Cheltenham Road, Kingswood, Bristol
	Nichols, W. T., A.M.I.Mech. E., A.F.R.Ae.S.	Fernleigh, Durbin Park Road, Clevedon, Somerset
	Nichols, Mrs. W. T.	Do.
	Ogilvie, M.A.	The Wildfowl Trust, Slimbridge, Glos.
	Parsley, Miss D. I.	8 Harley Place, Clifton, Bristol 8
	Paterson, A. W.	105 Belmont Road, Bristol 6
	Plenty, R. C.	30 Robin Hood Road, Brentwood, Essex
A.	Rabbitts, B. A.	108 Headley Lane, Headley Park, Bristol 3
	Rees, Miss A. E. S., B.Sc.	32 Royal York Crescent, Clifton, Bristol 8
	Rule, J. R., A.M.I.C.E., A.M.I.Mun.E.	26 Royal Albert Road, Westbury Park, Bristol 6
	Skeeles, E. H.	20 Victoria Square, Clifton, Bristol 8
	Smith, D. I., M.Sc.	70 Birchall Road, Redland, Bristol 6
	Smith, P. J.	7 Greville Road, Southville, Bristol 3
	Stannett, R. S.	75 Abbey Road, Westbury-on-Trym, Bristol
	Stott, Miss E. M., M.B.E.	10 Paulman Gardens, Long Ashton, Bristol
	Taylor, Mrs. R.	16 Stanbridge Road, Downend, Bristol
A.	Walton, C. G.	22 Reedley Road, Westbury-on-Trym, Bristol 9
	Whaley, Mrs. P.	Gaulacre, St. Mary's Grove, Nailsea, nr. Bristol
	Wilkins, P. A.	15 Walpole Street, Bristol 2

CHANGES OF ADDRESS

Bristow, C. M.	107 Wellington Hill West, Westbury-on-Trym, Bristol
Curber, R. M.	11 Weatherby Avenue, Odd Down, Bath, Somerset
Davis, Miss H. C.	Cowlin House, 28 Pembroke Road, Clifton, Bristol 8

	Fear, A. C. K., B.Sc.	Sutherland House, Clifton Park, Bristol 8
	Foster, Mrs. D.	8 Hanbury Road, Clifton, Bristol 8
A.	Frankum, R.	Conifers, Salisbury Road, Hungerford, Berkshire
	Gravestock, Miss I. F., B.A.	8 Cranleigh Gardens, Stoke Bishop, Bristol 9
	Grimes, N. W.	246 May Lane, King's Heath, Birmingham 14
	Gwillam, Miss F. M.	46 Hampton Park, Redland, Bristol 6
	Hamilton, D., B.A., M.Sc.	Dept. of Geology, University of Bristol, Bristol 8
	Hawkins, K. A.	53 Warleigh Drive, Barnfield, Bannerdown, Bath, Somerset
	Hawkins, P. G.	The Shieling, Shipley Road, Westbury-on-Trym, Bristol
A.	Haysom, Mrs. S. O. L.	Sunshine Cottage, Itchington, Alveston, nr. Bristol
	Hurrell, Miss E.	8 The Glen, Durdham Down, Bristol 6
C.	Jenkin, Miss P. M., M.A., D.Sc.	Scotland Mount, Hook Norton, Banbury, Oxfordshire
	Lillico, Mrs. C. W.	45 Downleaze, Stoke Bishop, Bristol 9
	Lillico, Miss J. W.	Do.
C.	Locke, S.	Cranbrook House, 16 Salisbury Road, Leicester
	Owen, Mrs. M. I.	62 Parry's Lane, Stoke Bishop, Bristol 9
	Pratt, Mrs. M.	62 North Road, St. Andrew's Park, Bristol 6
	Prowse, Dr. D. C., M.B., Ch.B., M.R.C.S., L.R.C.P.	Glencoe, Seafield Lane, Sidmouth, Devon
C.	Roberts, B.	44 St. Peter's Park Road, Broadstairs, Kent
	Rose, D. D.	30 Northcote Road, Wallesey, Cheshire
	Thompson, Mrs. M.E.	4 Ferndown Close, Kingsweston, Avonmouth, Bristol
	Webb, A. E.	Newport House, Newport, Berkeley, Glos.
	Webb, Mrs. A. E.	Do.

REPORT OF COUNCIL
1962

THE membership is now 626, including 59 juniors. There are 19 affiliated societies.

At the Annual General Meeting the Officers and Members of Council were elected with Mr. H. H. Davis as Centenary President. The outstanding event of the year was the celebration of the Society's Centenary. The main items were a dinner at which there were 196 members and 19 guests ; a reception, jointly with the S.W. Naturalists' Union, by the Lord Mayor; and an exhibition in the Museum. Fuller details of these events will be found elsewhere in this number. The usual General and Sectional meetings were held, and the Field Meetings were well attended.

We regret to have to announce the deaths of three members: two Honorary members, Mr. J. H. Savory (past President) and Mr. H. O. Edmonds; and Dr. L. G. G. Warne, a Corresponding member.

A. C. LEACH, *Hon. Secretary.*

REPORT OF ENTOMOLOGICAL SECTION
1962

AT the 98th Annual Business Meeting held on January 9, 1962, the following officers were elected: President, Mr. K. H. Poole; Secretaries, Dr. D. A. Stopher and Miss B. E. Jones; Committee, Mr. P. F. Bird, Mr. C. S. H. Blathwayt, Mr. D. G. Gibb and Mr. V. A. Watkins.

Following the business the retiring president, Mr. N. A. Watkins, gave his address on "Variation in British Butterflies".

During the year four indoor meetings and two field meetings were held:

Mar. 16: Aspects of collecting Butterflies and Moths. Mr. R. Hepworth.
May 27: Field meeting at Burrington Combe.
July 8: Field meeting at Inglestone Common.
Oct. 16: Social Insects. Mr. R. Bassindale, M.Sc.
Nov. 20: Annual Exhibition.
Dec. 11: Films—*Darwin and the Insects of Brazil, The Intruders* and *Raspberry Beetle.*

BARBARA E. JONES, *Hon. Secretary.*

The Hon. Treasurer in Account with the Bristol Naturalists' Society

RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31 DECEMBER 1962

Dr.

1961 £ s. d.			£ s. d.	£ s. d.	£ s. d.
	To Members' Subscriptions:				
515 1 0	Full Members	1961	10 0 0		
		1962	489 11 0		
		1963	22 17 6	522 8 6	
59 1 3	„ „ of the same household	1961	1 5 0		
		1962	53 8 9		
		1963	1 5 0	55 18 9	
11 17 5	Corresponding Members	1962	18 7 6		
		1963	3 5 0	21 12 6	
10 0 0	Associates	1962	8 0 0		
		1962	2 0 0	10 0 0	
20 10 0	Juniors	1961	7 6		
		1962	14 7 6		
		1963	15 0	15 10 0	
29 0 0	Affiliated Societies	1961	1 5 0		
		1962	27 15 0	29 0 0	654 9 9
645 9 8					
2 2 0	„ Donations				5 0
	„ *Proceedings* (1960):				
	Separates			10 9 6	
	Subscribers			2 0 0	
	„ *Proceedings* (1961):				
	Grants			15 0 0	
	Separates, including *History*			25 18 2	
	Subscribers			4 4 0	
38 2 4	„ Sales of Publications			4 16 0	62 7 8
					717 2 5
– – –	„ Sales of Badges				13 5 3
– – –	„ Refund of Junior Section funds on dissolution				6 0 3
13 16 5	„ Field Committee: surplus over expenses				– – –
– – –	„ Profit on film (£32 5 0) and credit for hire of hall (£11 16 3)				44 1 3
2 19 3	„ Profit on dinner				– – –
2 16 0	„ Interest on deposit in Post Office Savings Bank				2 17 6
10 0 0	„ „ „ £200 5% Defence Bonds				10 0 0
715 5 8					793 6 8
438 15 0	„ Balances from last account				468 4 6
£1,154 0 8					£1,261 11 2

P. J. M. NETHERCOTT, *Hon. Treasurer*,
14 January, 1963

Cr.

1961 £ s. d.		£ s. d.	£ s. d.
123 12 2	By General Printing and Stationery	74 9 2	
84 18 0	„ Postages and Telephone	93 8 6	
12 0	„ Cheque Books	12 0	
11 0 0	„ Clerical Assistance	12 0 0	180 9 8
220 2 2			
324 3 3	„ *Proceedings* (1961, including Separates)		430 11 2
– – –	„ Books	23 5 6	
– – –	„ Bookbinding	– – –	
21 5 6	„ Periodicals	24 17 7	
1 0	„ Rent (of Library Room)	1 0	
3 19 2	„ Fire Insurance (Library)	3 19 2	
2 6 8	„ Transport of books	– – –	52 3 3
	„ Subscriptions:		
2 10 0	Council for Nature, etc.	2 10 0	
3 8 0	South Western Naturalists' Union	3 6 0	
9 0 0	Steep Holm Trust	5 0 0	10 16 0
6 0 0	„ Fares and Expenses of General Meetings		7 5 6
– – –	„ Loss on Dinner		12 19 6
– – –	„ Field Committee: Excess Expenditure		4 1 10
81 4 2	„ Grants to Sections:		
	Botanical	18 0 0	
	Entomological	10 0 0	
	Geological	15 0 0	
	Ornithological	25 0 0	68 0 0
– – –	„ Badges		23 6 0
11 16 3	„ Prepayment *re* Film		– – –
– – –	„ Centenary Expenses		22 16 6
685 16 2			812 9 5
	„ Balances to next Account:		
101 6 11	Cash at Bank	83 8 6	
115 12 9	Deposit in Post Office Savings Bank	118 10 3	
200 0 0	£200 5% Defence Bonds	200 0 0	
51 4 10	In hands of Field Committee	47 3 0	449 1 9
£1,154 0 8			£1,261 11 2

Audited and found correct,
A. E. BILLETT, *Hon. Auditor*,
16 January, 1963

REPORT OF BOTANICAL SECTION

1962

At the Annual Business Meeting held in the Physiology Lecture Theatre of the University on January 8, 1962, the following officers were elected: President, Mr. I. W. Evans; Secretary and Treasurer, Miss I. F. Gravestock; Committee: Miss A. M. Sampson, Mrs. D. E. Bunce, Dr. A. F. Devonshire, Mr. J. A. Eatough, Mr. H. F. Howard, Mr. P. J. M. Nethercott, and Mrs. E. W. Yemm. Mrs. I. C. I. Milton was elected at the meeting on February 12.

The Wild Plant table at the Bristol Museum has been much appreciated during the year and sincere thanks are offered to Mr. A. Warhurst and Mr. P. F. Bird of the Museum and to Mr. I. W. Evans, Mrs. G. S. Wakefield and Mrs. C. H. Cummins, as well as to all members who have contributed specimens.

At the Centenary Exhibition in the Bristol Museum from June 4 to June 30, the Section exhibited the following as illustrating the "Natural History of the Bristol District":

The Limestone Flora of Bristol—Live plants collected by Mr. I. W. Evans and Mr. and Mrs. C. H. Cummins in the neighbourhood of Bristol.

Flora from Nailsea and District—Live plants collected by Mrs. D. E. Bunce.

Aliens now common in the Bristol district but rare or unknown in 1862—Herbarium specimens collected by Mr. I. W. Evans, with notes supplied by Dr. A. F. Devonshire.

Alien Grasses—Herbarium specimens collected by Mr. I. W. Evans.

Mycetozoa—A collection of specimens with maps and details of structure and life histories by Mr. F. W. Evens.

Flower Photographs by Mr. J. A. Eatough.

Thanks are due to all who helped to make the exhibition a success, both exhibitors and helpers behind the scenes, and not least to Mr. F. R. Sterne who constructed a viewer enabling plant transparencies taken by Mr. J. A. Eatough and Miss G. Robinson to be seen.

The following Winter meetings were held during the year:

Jan. 8: Annual Business Meeting, followed by papers on the history of the Section by Mr. F. W. Evens, Mr. I. W. Evans and Dr. A. F. Devonshire.
Feb. 12: Recent Advances in Seaweed Utilisation, by Professor Lily Newton, D.Sc., Ph.D., F.L.S.
Mar. 12: The Systematics and Ecology of Wild and Cultivated *Asparagus*, by Dr. Elizabeth W. Woodward, B.Sc., Ph.D.
Oct. 15: Some Thoughts about the Study of Mosses, by Dr. E. V. Watson, B.Sc., Ph.D.
Nov. 12: Short papers and transparencies by members.
Dec. 10: *Spartina* Problems, by Dr. Joyce Lambert, M.A., Ph.D.

The following field excursions took place under the leadership of those shown:

Apr. 28: Easter Compton to Severn Beach. Miss I. F. Gravestock.
May 26: Lansdown, Swainswick and Batheaston. Mr. H. F. Howard.
June 20: Dundry Hill. Miss A. M. Sampson.
June 23: "The Thunderbolt Track", Limpley Stoke to Bath. Dr. A. F. Devonshire.
June 27: Visit to Stapleton Waterlily Pool and Snuff Mills. Mr. I. W. Evans.
July 14: Butleigh and Sharpham. Mr. I. W. Evans and Dr. A. F. Devonshire.
July 21: Stokeleigh Forest. Mr. I. W. Evans.
July 28: Berrow and Brean. Dr. A. J. Willis.
Aug. 18: Stockwood to Keynsham. Mr. I. W. Evans.
Aug. 21: Keynsham to St. Anne's. Mr. J. A. Eatough.
Sept. 1: Tutshill and Lancaut. Mr. P. J. M. Nethercott.
Sept. 15: Ebbor Rocks. Mr. J. A. Eatough.

I. F. GRAVESTOCK, *Hon. Secretary.*

REPORT OF GEOLOGICAL SECTION

1962

AT the Annual Business Meeting held in the Geology Department of the University on January 10, 1963, the following officers were elected:—President, Mr. R. Bradshaw; Vice-President, Dr. J. W. Cowie; Hon. Secretary, Miss M. Smith; Field Secretary, Mr. A. C. K. Fear; *Ex-officio*, Professor W. F. Whittard and President of Students' Geological Society; Committee, Mr. V. D. Dennison, Mr. T. R. Fry, Mr. C. E. Leese, Mr. R. G. Payne, Dr. F. C. Phillips, Dr. R. J. G. Savage, Mr. W. Stock, Mr. D. Vowles.

During 1962 the Committee met twice, on January 11 to make proposals for officers and on January 25, to arrange Summer and Winter programmes. The Annual General Meeting was held on January 11, when reports were read and officers elected. Dr. J. W. Cowie gave his presidential address and showed a film on Arctic Canada.

There were four lecture meetings of the Section during the year:

Feb. 15: Mr. F. W. Sherrell—A Commercial Geologist in Devon and Cornwall.

Mar. 22: Dr. A. J. Sutcliffe—Looking for Remains of Fossil Mammals.

Oct. 25: Mr. B. D. Webby—The Devonian Rocks of West Somerset.

Nov. 22: Dr. F. S. Wallis—The History of the Geology Section of the Bristol Naturalists' Society.

There were four Field Meetings during the Summer as follows:

Apr. 14: Kilve and St. Audries; leaders Messrs. C. E. Leese and J. R. Hamilton.

May 12: Northern Cotswolds; leader Dr. D. T. Donovan.

June 30: Severn Bridge and Aust; leader Mr. I. H. Ford.

Sept. 22: Stoke Lane, Waterlip, Doulting and Mells; leader Mr. T. R. Fry.

This was the Centenary Year of the parent Society and the Committee wish to put on record their thanks to all members of the Section who helped to make the various functions associated with the Centenary such a success.

The Section would like to thank Dr. D. T. Donovan for his services to the Section and to the Society, and to congratulate him on his appointment as Professor of Geology, Hull University.

All lectures were held in the Geology Department of the University, and the Section would like to record its thanks to Professor Whittard and its indebtedness to the University for making the premises freely available for these activities.

R. G. PAYNE, *Hon. Secretary.*

REPORT OF ORNITHOLOGICAL SECTION
1962

"THE WREN THE WREN
THE KING OF ALL BIRDS . . ."
PS

AT the 38th Annual Business Meeting in January, Mr. G. Sweet was re-elected President and Mr. S. M. Taylor Hon. Secretary. Messrs. B. King and R. E. Hitchcock were elected to the Committee in place of Messrs. P. J. Chadwick and G. A. Forrest who retired by seniority. Mrs. G. C. Buxton, Miss R. C. Lee, and Messrs. J. D. R. Vernon, R. M. Curber and R. F. Thearle remained in office.

During 1962 the Section held six indoor meetings. The speakers and subjects were:

Jan. 12: Annual Business Meeting; Mr. J. Reynolds—Reflections on Two Years' Birding in Tanganyika.

Feb. 7: Mr. K. Williamson—Migration Research at the Bird Observatories.

Mar. 28: Dr. C. J. F. Coombs—Endocrine Influences on the Breeding Behaviour of the Rook.

Oct. 10: Dr. B. Campbell—Twenty Years of Nest-boxes.

Nov. 9: Annual Field-work Meeting

Dec. 12: Mr. R. E. Hitchcock—Autumn Migration in Greece.

Attendance at these meetings ranged from 44 to 110 and averaged 72.

Afternoon or evening field walks were arranged in the Spring to Backwell Hill, Cadbury Camp, the coast at Clevedon and Inglestone Common, and an enjoyable all-day excursion to Exmoor in June was attended by 35 members.

A film show in conjunction with the Royal Society for the Protection of Birds was arranged in March on behalf of the Society, the proceeds being devoted to the costs of the Centenary Celebrations. The Section's exhibit in the Centenary Exhibition was a considerable success, due in no small measure to the exertions of Mr. Sweet and to Mr. Hitchcock's excellent photographs. Besides features concerned with our co-operative field-work, a display of colour slides was devoted largely to a fine series from Steep Holm, dealing with the work of the Gull Research Station.

During the year, co-operative field-work included a repeat of the Breeding Season Census of Rookeries in the Severn Vale and a continuation of the Shelduck Survey. Members also took part in the Ringing Scheme, Nest Record Scheme, Inland Observation Point Scheme and Breeding Season Census of Common Birds of the British Trust for Ornithology.

We were sorry to lose a valued member, past President and frequent lecturer by the sudden death in June of Mr. J. H. Savory. Miss A. E. Taylor, another old member who had given considerable support to the Section in former years, died in December, 1961.

S. M. TAYLOR, *Hon. Secretary.*

ACCOUNT OF THE GENERAL MEETINGS

1962

THE 99th Annual General Meeting was held on Thursday, Jan. 18. The Officers and Members of Council were elected, with Mr. H. H. Davis as President for the Centenary year, and Miss M. H. Rogers as Centenary Vice-President. For his Presidential address the retiring President, Dr. F. Coles Phillips, spoke on "A further contemplation of Symmetry in Nature", thereby continuing the theme of his previous address. It was again illustrated by ingenious models and slides and proved an unusual and very interesting talk.

On Feb. 1, Mr. D. A. T. Morgan came from Suffolk to speak on "Nature Reserves" and stressed how the question of protection is becoming acute. He showed slides of Minsmere, Havergate, and the National Park in the Cairngorms: the rectangular blocks of the new plantations there do not seem to suit wild life as well as the scattered trees of the old Rothiemurchus forest.

On Feb. 27, Professor P. Allen of Reading University lectured on "The Wealden Sea". What he talked about happened some 130 million years ago, a time when animal life on land was dominated by large reptiles. Important components of the flora were forms related to the living Horsetails. Where these plants had grown in brackish water they were poor and left fragmented fossilised remains, but for 400 square miles of Sussex there was an almost solid mass of them. Pictures of the Mississippi delta provided some parallel to the conditions which may have occurred.

On Oct. 4, Mr. R. Bassindale of the University of Bristol, a former President of the Society, gave us one of his beautifully illustrated talks entitled "Life on the Shore". He showed us how both animal and plant life of the shore—the area between Spring High and Low tide marks—had to adapt itself to the tidal factor. The beautiful colours of much of the plant and animal life were admirably shown in his slides and also in his film of the Gold Coast area.

A. CROOME LEACH, *Hon. Secretary.*

GENERAL FIELD MEETINGS

EIGHTEEN field meetings were held during the year and again proved popular, particularly the repeat visit to Portland, when two coaches were run. The most notable event of the year was the Centenary Walk; members walked over part of the same ground as the original members of the Society had done at their first field meeting one hundred years previously.

Two joint meetings were held, one with the Wiltshire Natural History Society on Oct. 28, and one with the Folk House Archaeological Club on Nov. 18.

For the second time the Field Committee arranged a Social Evening (on Mar. 23). Mr. F. R. Sterne was again the speaker, and 91 members attended.

A brief summary of the meetings under the leadership of those named is given below, and a much fuller account is kept in the records of the Field Committee.

Jan. 14: Dawlish Warren and the Exe Estuary. Mr. D. A. C. Cullen and Mr. B. King.

Feb. 18: Brean Down. Mr. H. G. Hockey.

Mar. 17: Nature Conservancy, Huntspill. Mr. H. F. Flook.
Apr. 29: West Quantoxhead. Mr. H. G. Hockey and Major Dowling.
May 16: River Avon, Hanham. Mr. D. A. C. Cullen.
May 20: Crook Peak. Mr. H. G. Hockey.
June 3: Pilton, Glastonbury and Shapwick Heath. Mr. D. A. C. Cullen and Mr. I. W. Evans.
June 18: Stoke Park and Duchess' Pond. Mr. H. G. Hockey.
July 2: Staverton and Bradford-on-Avon. Miss A. M. Sampson.
July 7: Caerphilly Castle, Pisgodlyn Mawr, and Llantwit Major. Dr. A. F. Devonshire.
July 11: **Centenary Walk,** Kennet and Avon Canal and Claverton. Mr. F. R. Sterne.
Aug. 11: Court Hill and Cannington Farm Institute. Miss C. Groves and Mr. I. W. Evans.
Aug. 26: Wedmore District. Mr. H. F. Flook.
Sept. 9: Clatworthy Reservoir. Mr. H. G. Hockey.
Sept. 23: Portland Bill and Bird Observatory. Mr. D. A. C. Cullen, Mr. B. King and Dr. D. A. Stopher.
Oct. 28: Roundway Down (for mapping badger setts). Mr. F. R. Sterne and Miss B. Gillam.
Nov. 18: Stonehenge, Woodhenge and Winterbourne Barrows. Mr. E. J. Mason and Mr. A. C. K. Fear.
Dec. 8: National Museum of Wales, Cardiff. Mr. A. C. K. Fear.

A. F. DEVONSHIRE, *Hon. Field Secretary.*

HON. LIBRARIAN'S REPORT
1962

BOOKS purchased during the year included:

A Textbook of Mineralogy	E. S. Dana, 4th edition by W. E. Ford
Birds and Woods	W. B. Yapp
Animal Dispersion in relation to Social Behaviour	V. C. Wynne-Edwards
Atlas of European Birds	K. H. Voous
Atlas of the British Flora	F. H. Perring and S. M. Walters (editors)
British Regional Geology (set of 18)	H.M.S.O.

The Society acknowledges with thanks the gift of "Nature in Britain" from Miss M. E. Habgood.

132 books and periodicals were borrowed during the year by 34 members.

R. BRADSHAW, *Hon. Librarian.*

HARRY SAVORY
with juvenile Peregrine
The Denny, June, 1952

[*face p. 299*

OBITUARY

JAMES HENRY SAVORY

By the death on June 25, 1962, of J. H. Savory the Society lost a great personality and a very loyal supporter. Harry Savory, as he liked to be known, was the eldest son of Ernest Wyman Savory and was born at Cirencester in 1889. He came to Bristol in 1895, was educated at Clifton College and subsequently entered the family business of fine art printing and publishing. He served with the Royal Engineers in the first World War, reaching the rank of Captain and being severely wounded in April, 1915.

He joined the B.N.S. in 1914 but his membership was soon interrupted by war-time service. He rejoined in 1931 and began what proved to be a long and valuable association with the Ornithological Section, of which he was President for 1933, 1935 to 1938 and 1945 to 1947. He was twice in office as Vice-President of the parent Society (1935–1936 and 1949–1950) and was President for the years 1954 and 1955. On the foundation of the Steep Holm Trust in 1953 he represented the Society in negotiations for the lease of the island and undertook the dual office of Chairman and Secretary of the Trust. With his usual sincere regard for the welfare of young people, he was largely instrumental in 1955 in obtaining Council's approval for the formation of a Junior Section, and was appointed Chairman of its adult Advisory Committee. By his social attributes and seating plans which he drew up with infinite care, he did much to ensure the success of recent Annual Dinners of the Society—notably that of the Centenary Year. His many services to the Society were recognised by his election in 1962 as an Honorary Member.

He was a member of the Somerset Archaeological and Natural History Society for half a century, and for over thirty years of its Ornithological Section, of which he had been President since 1958. His membership of the Wells Natural History and Archaeological Society dated from as long ago as 1911, and he was a keen supporter, from its earliest days, of the Lundy Field Society. He joined the Wildfowl Trust soon after its inception, and was a Founder Member of the newly formed Gloucestershire Trust for Nature Conservation.

Among other of his numerous and varied interests, he was a Council member of the Royal West of England Academy; a Life member of the Bristol Savages; a member of the Royal Commonwealth Society and the Anglo-Netherlands Society; and a zealous worker in the Moral Re-armament movement.

Harry Savory was an ardent naturalist with a deep-rooted appreciation of the countryside and its traditions, and whether in the field or at indoor functions was always a delightful and most helpful colleague. The exploration of Mendip caves was one of his early pursuits; in this he was a pioneer in cave photography (see *Rep. Wells Nat. Hist. and Archaeol. Soc.*, 1921, 1922). He then took up falconry and bird photography, and some who knew him in the 1930's will recollect his Peregrines which were trained on the Wiltshire Downs, and his Goshawk which, to the ultimate alarm of the local pheasants, broke loose from its quarters at Abbots Leigh! Falconry brought him in close touch with the famous bird artist G. E. Lodge, whose work, particularly on the birds of prey, he studied and greatly admired. As a bird photographer he achieved marked success, and during visits to the Continent obtained pictures on the island of Texel and elsewhere that will remain a lasting tribute to the high standard he attained. An opportunity to revisit Texel and other of his former Dutch haunts came in April, 1960, when he acted as co-leader on a Junior Section excursion to Holland.

His enthusiasm, whatever the interest, in no way diminished with advancing years; on the contrary it seemed to grow and, as if to add to his many commitments, he had recently devoted much time and energy in maintaining the natural amenities on Steep Holm and in assisting with the equipment of the barrack buildings for accommodation and research. He had also covered a great deal of Somerset in carrying on the Rev. F. L. Blathwayt's formidable task of locating and describing former duck decoy sites in the County. As a speaker and lecturer he was often in demand, his ability in this sphere being clearly shown by his frequent lectures to the Society and its Sections.

In the B.N.S., and in far wider circles, he will be remembered for his sound judgment, high sense of duty and, not least, for his warm-hearted and genial disposition.

H.H.D.

BRISTOL BOTANY IN 1962

By N. Y. Sandwith

1962 WAS another disappointing year with only one good month, October, of consistently warm and sunny days. March was bitterly cold, and the six succeeding months of the botanising season were chilly, wet and windy. After a poor November, December came in with frost and fog, and the dreadful freeze which began at Christmas will live long in the memory.

Botanically, the outstanding events were those of the publication of the greatly improved second edition of Clapham, Tutin and Warburg's "Flora of the British Isles" and of the splendid "Atlas of the British Flora", edited by Drs. F. H. Perring and S. M. Walters. Some members will no doubt find that they can fill gaps in the Atlas with circles, both solid and hollow, for the squares covered by our district, and I understand that a second edition, or at least a second impression, is already being prepared at Cambridge.

The ruthless ploughing up, last summer, of the whole of the steep southern slope of Cadbury Camp means the loss of a well-known station for the rare *Rosa agrestis* and of a good colony of white-flowered forms of *Viola hirta*, not to mention all the other wild Roses, and the Thyme, Marjoram and St. John's Wort of the indigenous limestone flora. We may hope that *R. agrestis* survives in this neighbourhood : Miss I. M. Roper recorded the var. *belnensis* from the "Cadbury Ridge towards Clevedon" in "Bristol Botany in 1926", and her Clapton Wick gathering of this variety was passed by Col. Wolley-Dod, see *Bot. Exch. Club Brit. Is.*, 1925 *Rep.*, in vol. vii, pt. vi, p. 1,048 (1926). Meanwhile, I was told by the occupier of the villa below the foot of this slope that it is to be sown with grass, "which will be much nicer".

As usual, the names of principal contributors to the following notes are abbreviated, thus:—

I.W.E., I. W. Evans	D.M.S., Dr. D. Munro-Smith
R.M.H., R. M. Harley	P.J.M.N., P. J. M. Nethercott
J.G.M., Major J. G. MacGeorge (decd.)	A.J.W., Dr. A. J. Willis

Records without indication of the finder are my own.

Aquilegia vulgaris L. Near Cheddar Wood, Axbridge, **S.**, 1961, *P.J.M.N.*

Spergularia marginata Kittel var. *aptera* E. S. Marshall. Clevedon, **S.**, Aug. 21st, 1896, *D. Fry* in *Herb. D. Fry* (as "*Lepigonum salinum* Fr.") now in *Herb. Bristol Univ.*, det. *J. A. Ratter.* This record should be noted in connexion with D. Fry's comments on plants of *S. marina* (L.) Griseb. (*S. salina* Presl) with wingless seeds found by him at Clevedon, see *White, Bristol Fl.*, p.198. There seems to be no previous local record for var. *aptera.*

Ononis spinosa L. Several bushes of the form with small grey-blue flowers (var. *violacea* (Peterm.) Wohlf. ?, see "Bristol Botany in 1940") were found on the sea-bank at Sheperdine, **G.**, by *P. G. Munro-Smith.* It was also sent to me last summer from a locality in Hertfordshire, by Dr. J. G. Dony.

Lotus tenuis Waldst. et Kit. St. Vincent's Rocks, Bristol, **G.**, ex *Herb. A. B. Lambert* in *Herb. Hooker*, in the Kew Herbarium. Lambert died in 1842, and his great herbarium was sold in lots.

Sorbus Wilmottiana E. F. Warburg. This new taxon, apparently endemic in our Avon Gorge, Clifton, **G.** and **S.**, is described (but not validly published with a Latin diagnosis) in the second edition of the "Flora of the British Isles", p.432. The tree which has sometimes been spoken of as "the type" is a small one on the Gloucestershire side of the Gorge, in an accessible spot known to many botanists. Mr. Nethercott writes that, unlike our other *Sorbi*, this taxon is more frequent on the Gloucestershire side of the Gorge, being decidedly rare on the Somerset side.

Crataegus oxyacanthoides Thuill. Stockwood Lane, Whitchurch, **S.**, *I.W.E.*, confirmed by *A.J.W.*

Berula erecta (Huds.) Coville. Frequent at inland margin of salt-marsh, Berrow, **S.**, *A.J.W.*

Silaum Silaus (L.) Schinz et Thell. Pasture bordering Tickenham Moor, **S.**

Galium Mollugo L. × *verum* L. A patch on Observatory Hill, Clifton, **G.**

Anthemis arvensis L. Roadside, Downend, **G.**, *D.M.S.*

Senecio viscosus L. Wayside, Lyde Green, **G.**, *D.M.S.*

Onopordum Acanthium L. Bleadon, **S.**, 1946, *J.G.M.*, ms. notebook.

Crepis biennis L. Swainswick, near Bath, **S.**, *I.W.E.*

Hieracium vulgatum Fr. Wayside, Winterbourne, **G.**, *D.M.S.*, det. *P. D. Sell* and *C. West.*

H. anglorum (Ley) Pugsl. Quarry by the river at Hanham, **G.**, 1952, *I.W.E.*, det. *Sell* and *West.*

H. perpropinquum (Zahn) Druce. (*H. boreale* of *White*, *Fl.*). Wood above Compton Dando, **S.**, 1931, det. *Sell* and *West.*

H. umbellatum L. Rodway Hill, Mangotsfield, **G.**, *D.M.S.*, det. *Sell* and *West.*

Armeria maritima (Mill.) Willd. A single tuft in an area of mud and sand at Berrow, **S.**, *P.J.M.N.*

Centaurium Erythraea Raf. (*Erythraea Centaurium* Pers. of *White*, *Fl.*). Dwarf plants collected by *P.J.M.N.* during the second half of August on Wavering Down and Compton Hill, **S.**, bore flowers with filaments inserted ½—⅔ of the distance down the tube of the corolla, but were otherwise to be referred to the Common Centaury, not to the rare *C. capitatum* (Willd.) Borbás which grows on the neighbouring Crook Peak (see "Bristol Botany in 1950"). Mr. Nethercott's specimens are of interest in the light of a recent paper by the Danish botanist Knud Jacobsen, published in *Botanisk Tidsskrift*, vol. 56, Hefte 2, pp. 89–104, figs. 1–4 (1960). The author shows that there are four pairs of very closely allied species of the genus *Centaurium* in each of which the main distinguishing character is found in the insertion of the stamens, at the throat of the corolla or lower down its tube. He points out that differences in the position of insertion are mainly results of a different type of growth of the corolla tube: in the Common Centaury the tube is developed by intercalary growth below the insertion, in *C. capitatum* mainly above. He states that young flowers of *C. capitatum* have the same appearance as flowers at the same developmental stage of the common species, and he further suggests that the development of the corolla may be in unstable equilibrium with other parts of the flower. He concludes that the whole question about these four pairs of species should be further elucidated through studies on meiosis and experimental cultivation. While heartily endorsing this, one may remark that, in Britain, *C. capitatum* seems to occur as definite populations with a distinctive facies and flower colour, noteworthy also for their early flowering in the first half of July.

Gentianella Amarella (L.) Börner. Persists in the Forestry Commission portion of Leigh Woods, **S.**, *P.J.M.N.*

Mentha × *gentilis* L. var. *gracilis* (Sole) Briquet. Border of allotments, Downend, **G.**, *D.M.S.*, confirmed by *R.M.H.*

Daphne Laureola L. In a second locality on Clifton Down, **G.**, 1961, *P.J.M.N.*

Carpinus Betulus L. Ebbor Gorge, **S.**, a single tree, 1961, *P.J.M.N.*

Ophrys insectifera L. Three specimens of a strange virescent sport of the Fly Orchid were found last June in the well-known colony in the Avon Gorge under Leigh Woods, **S.**, by *A. J. Hughes* (the discoverer), *Dr. J. F. Hope-Simpson* and *A.J.W.* The inner tepals of all these plants were green, and the flowers showed an approach to the "peloria" condition, with the tepals all more or less alike, and with 1 – 2 additional perianth members near the lip, together with 4 anthers on the column and (in one instance) an additional column. Mr. V. S. Summerhayes, who reported on these specimens, remarked that monstrous forms of the Fly Orchid have been frequently recorded but that it is "rather futile to try to speculate about the morphology of such freaks since we do not even know what are the homologies of many parts of the normal orchid flower".

Scilla autumnalis L. Mr. Nethercott draws attention to an early reference to this plant at Bristol quoted in a 1962 Bristol City Museum publication, "Bristol Scenery 1714—1858", reproducing a drawing by Samuel Hieronymus Grimm (1733–1794) of "The South part of St. Vincent's Rock, 1789" inscribed "Projection of the S. part of St. Vincent's Rock, Clifton, Glocestersh. abounding in autumnal hiacinths".

Sparganium erectum L. subsp. *microcarpum* (Neum.) Domin. Pond, the Ridings, Chipping Sodbury, **G.**, *G. W. Garlick*, confirmed by *Dr. C. D. K. Cook.*

Wolffia arrhiza (L.) Hork. ex Wimm. Has reached the eastern end of the peat moor at Sharpham, **S.**, *O. Buckle.*

Potamogeton natans L. Pond, Downend, **G.**, *D.M.S.*

P. coloratus Hornem. The record of *P. polygonifolius* Pourr. from Tickenham Moor, **S.**, *C. Bucknall*, in *White, Fl.*, p.608, should be transferred to *P. coloratus*, which still occurs on Tickenham Moor. Bucknall himself knew that the plant on these moors was *P. coloratus*, and there are specimens in his herbarium (now in the Bristol University Herbarium) gathered in 1902 and 1903, labelled *P. plantagineus* Ducr. (a synonym of *P. coloratus*). Many years ago, in 1920, Bucknall showed me the plant, as *P. coloratus*, on Tickenham Moor.

Scirpus sylvaticus L. Hambrook, **G.**, 1948, *J.G.M.*, ms. notebook.

Carex pendula Huds. Shirehampton, **G.**, *P.J.M.N.*

Alopecurus × *hybridus* Wimm. Still in the pasture on the edge of Tickenham Moor, **S.**, where it was found 20 years ago (see "Bristol Botany in 1942"). No further locality has been reported.

Calamagrostis Epigejos (L.) Roth. Marshy copse, Frampton Cotterell, **G.**, *D.M.S.*

Koeleria vallesiana (Honck.) Bertol. Wavering Down and Cross Plain, **S.**, *P.J.M.N.*, who writes that these localities connect the well-known station on Crook Peak with that on Shute Shelve recorded in "Bristol Botany in 1958".

Molinia caerulea (L.) Moench. Rodway Hill and Lyde Green, **G.**, *Miss I. M. Roper*, ms. in her interleaved copy of *White, Fl.* Still on Rodway Hill (one tuft), *D.M.S.*

Bromus racemosus L. Field on Walton-in-Gordano moor, **S.**, *R.M.H.* Pasture on the peat moor below Mudgley, **S.**

Blechnum Spicant L. On sandstone rock in a wood by the Frome, Winterbourne Down, **G.**, *D.M.S.*

Polystichum setiferum (Forsk.) Woynar var. *proliferum* Moore. Woods near Holly Lane, Clevedon, **S.**, *H. W. Bird.*

Polypodium vulgare L. The new edition of the *Flora of the British Isles* divides this aggregate into three species with different chromosome numbers and with distinguishing characters found in the fronds, the sori and the annulus of the sporangium. The account tallies with the researches and the excellent paper by M. G. Shivas published in the *British Fern Gazette*, vol. 9, pt. 3, pp. 65–70, figs. 1–3 (1962), and see also the fuller account in *Journ. Linn. Soc., Bot.*, 58, pp. 13–38 (1961), and the note in *Proc. B.S.B.I.*, 4(3), p. 335 (1961). The three species, *P. australe* Fée (diploid), *P. vulgare* L. (tetraploid) and *P. interjectum* Shivas (hexaploid), all occur in our area but their distribution needs working out (all three are recorded by Shivas from vice-county 6, N. Somerset; so far, only *P. interjectum* is recorded from vice-county 34, W. Gloucester); moreover, they are connected by hybrids. The most interesting of the three, *P. australe*, confined to limestone in S.W. England, Wales and S.W. Ireland, was recognised many years ago in Cheddar Gorge, **S.**, by *Dr. Elizabeth W. Davies*: this taxon of southern distribution has the lowest chromosome number of the three ($2n=74$), and *P. interjectum* is the final, fertile result of original crossing between *P. australe* and *P. vulgare.*

ALIENS. It was a very poor year at Avonmouth Dock, **G.**, and my only find of note was *Salvia reflexa* Hornem., previously recorded there 10 years ago by *Mr. C. C. Townsend* ("Bristol Botany in 1952"). *Mr. J. E. Lousley* and *Mrs. N. Saunders* found *Brassica Tournefortii* Gouan, *Abutilon Theophrasti* Medic., *Trigonella foenum-graecum* L. and *Cosmos bipinnatus* Cav. on their visit to the Dock.

Herniaria glabra L. Tip at Shirehampton, **G.**, 1961, *P.J.M.N.*, det. *Dr. L. C. Frost.* New to the Bristol adventive list.

Trifolium ochroleucon Huds. Avonmouth Dock, **G.**, 1949, *I.W.E.* in City Museum Herbarium. New to the Bristol adventive list.

Philadelphus coronarius L. 6–8 bushes well established in Stoke Park Wood, Stapleton, **G.**, *I.W.E.*, confirmed by *A.J.W.*

Bupleurum rotundifolium L. Roadside, Bathwick Hill, Bath, **S.**, 1914, *L.V. Lester-Garland*, specimen in Kew Herb.

B. lanceifolium Hornem. (*B. protractum* Hoffmgg. et Lk. of *White, Fl.*). Waste ground, Bury Hill, Winterbourne, **G.**, *D.M.S.*

Centaurea diluta Ait. Tip, Shirehampton, **G.**, 1961, *P.J.M.N.*

C. iberica Trev. Waste land, St. Anne's, Brislington, **S.**, 1958, *I.W.E.* A form with long, stout involucral spines, perhaps referable, like some previous Bristol gatherings, to var. *Holzmanniana* Heldr.

Verbascum phlomoides L. Wayside, Frampton Cotterell, **G.**, with both yellow and white flowers, *D.M.S.*

Chenopodium murale L. Waste ground, Kingsdown, Bristol, **G.**, *I.W.E.*

Rumex pulcher L. subsp. *anodontus* (Hsskn.) Rech. fil. Avonmouth Dock, **G.**, 1931, *I.W.E.*, det. *J. E. Lousley*, in City Museum Herbarium. This subspecies is new to the Bristol list.

Euphorbia Lathyrus L. Near Backwell, **S.**, 1946, *J.G.M.*, ms. notebook.

Elodea callitrichoides (Rich.) Casp. In a canal basin within the city of Bath, **S.**, 1961, not seen in 1962, *P.J.M.N.*

Allium carinatum L. Has appeared on the tow-path bordering Leigh Woods under Clifton Suspension Bridge, **S.**, *I.W.E.* According to *Miss I. M. Roper*, ms. in her interleaved copy of White's Flora, this species was planted on St. Vincent's Rocks, **G.**, about 1897 by *G. H. Wollaston*, as he confessed to her in May, 1917. Miss Roper's ms. also refers to an article on the sowing of seeds on the rocks by the Suspension Bridge, quoting from "The Life of Canon Barnett", by Mrs. Barnett, pp. 210–211, in "The Observer" for May 23rd, 1920.

Digitaria sanguinalis (L.) Scop. By the drinking fountain near the Suspension Bridge, Clifton, **G.**, *R.M.H.*

BRYOPHYTES. *Weissia Levieri* (Limpr.) Kindb. This rare moss, mainly of southern European distribution, was found new to the British Isles, on Brean Down, **S.**, during the British Bryological Society's meeting at Wells in April, 1959. A full account, by Dr. E. F. Warburg, of this discovery was published in the *Transactions of the British Bryological Society*, vol. 3 (pt. 5), pp. 713–714 (1960). The moss is said to grow "in sheltered earthy crevices on the south side of the down".

> Dr. Munro-Smith sends some interesting records of mosses from stones of the railway embankment between Coalpit Heath and Winterbourne, **G.**; these forms are usually associated with mountainous regions and may have been imported with the slag (all records confirmed by referees):—
> *Ptychomitrium polyphyllum* (Sw.) Fürnr.; *Rhacomitrium heterostichum* (Hedw.) Brid., and var. *gracilescens* B. et S.; *R. lanuginosum* (Hedw.) Brid.; *R. canescens* (Hedw.) Brid.

As before, I am much indebted to Dr. Willis for his help in assembling records and verifying voucher specimens. It would greatly assist both him and myself if all such records and specimens reached us by December 1st each year and in no case later than January 1st.

BRISTOL BIRD REPORT
1962

COMPILED BY THE EDITORIAL COMMITTEE OF THE
B.N.S. ORNITHOLOGICAL SECTION

P. J. CHADWICK H. H. DAVIS
M. A. WRIGHT

RECORDS in this issue relate only to 1962. Additional details for North Somerset may be found in the corresponding number of the annual *Report on Somerset Birds.*

Observations of special importance include those of a Gyr Falcon (first seen in previous November) at Chew Valley in January; Waxwings at Bath in February – March; a Long-tailed Duck at Barrow Gurney from March to May and at Chew Valley in December; a Roseate Tern at Clutton in May; Shearwaters in the Channel as far up as the Holms and Portishead in June – July; and a Montagu's Harrier at Chew Valley in August. The spread of the Collared Dove has continued, reports showing a remarkable increase—particularly at Avonmouth and in Bristol urban areas (see also *Proc. B.N.S.*, 1961).

Among records of waders are: exceptional gatherings of Bar-tailed Godwits (720+) at the New Grounds on April 29th and Black-tailed Godwits (360) at Sand Bay on the same date, and at the reservoirs; Little Ringed Plovers and Curlew Sandpipers on both passages, and a Temminck's Stint and unusual numbers of Spotted Redshanks in autumn.

The effects of severe weather (late December – early January) and of the following cold, dry spring are referred to under various species in the systematic list. The Report concludes with a summarised account of autumn migration as recorded on Steep Holm in September–October.

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Scott, C. Selway, T. B. Silcocks, P. T. Sims, B. E. Slade, Brig. C. E. H. Sparrow, W. J. Stone, I. H. Sutherland, G. Sweet, Mrs. M. V. Taylor, Miss S. K. Taylor, S. M. Taylor, H. A. Thornhill, L. Tucker, J. D. R. Vernon, W. F. Vernon, J. W. Watkin, T. R. J. Williams, M. G. Wilson, M. A. Wright and K. B. Young. The *abbreviation* Res. Stn. refers to the Steep Holm Gull Research Station and the *initials* W.T. denote Wildfowl Trust.

Headings **G.** and **S.** refer to South Gloucestershire and North Somerset, and cover the areas as outlined in previous Reports (cf. *Proc. B.N.S.*, 1960, p.114).

GREAT NORTHERN DIVER *Gavia immer*

S. Single bird, Cheddar res., Jan. 28 – Feb. 18, but two, Feb. 4 (J.R.B., J.A.McG., H.W.N.). One, Chew Valley res., Mar. 3 (G.G.C.), 17 (R.A.).

RED-THROATED DIVER *Gavia stellata*

S. Dead ad. female, Uphill Beach, Weston-s-Mare, Feb. 17 (R.H.P.).

GREAT CRESTED GREBE *Podiceps cristatus*

S. Usual numbers on reservoirs, Jan. – Feb., with pre-breeding season increase to 60+, May 25 (14, Blagdon ; 37, Cheddar ; 13, Chew Valley). Numbers at about same total to late summer (15, Barrow Gurney ; 15, Blagdon ; 30+, Chew Valley) but birds did not breed owing to low water levels. Max. autumn counts—44, Chew Valley, Dec. 23, and 17, Cheddar, on 26th (P.J.C., R.M.C., T.D.H.M., T.B.S., M.A.W. *et al.*).

SLAVONIAN GREBE *Podiceps auritus*

S. Single birds, Blagdon res., Feb. 3 (R.M.C.) and Cheddar res., Dec. 2 (J.A.McG.).

BLACK-NECKED GREBE *Podiceps nigricollis*

S. One, Cheddar res., Oct. 21 (B.K.). [Others reported from Blagdon, Feb. 8 and Chew Valley, Mar. 3, but details not fully conclusive and records could refer to previous species—Eds.].

MANX SHEARWATER *Procellaria puffinus*

S. Party of six passing W. off Flat Holm flew some distance toward Steep Holm before continuing westwards, July 19 (G.S.). About 40 shearwaters (unidentified but probably Manx) flying down Estuary between Portishead and The Denny, June 22 (J.V.B., J.D.R.V.).

GANNET *Sula bassana*

S. Adult, Chew Valley res., Apr. 11, 12 (S.E.C.). One off Steep Holm, Sept. 28 (Res. Stn.).

SHAG *Phalacrocorax aristotelis*

S. Ringed bird nr. Old Bridge, R. Avon, Bath, Mar. 20 to end of year: ring number read through telescope, Mar. 25 (1024070)—bird ringed as nestling, Bass Rock, 320m. N., 12/6/61 (R. G. Douthwaite *et al.*). Imm., Cheddar res., Mar. 31 (R.M.C.) and ad., Weston-s-Mare, May 19 (R.A.). Evidently all involved in large 'wreck' which occurred in early March—cf. *Brit. Birds LV*, p.200 (Eds.).

HERON *Ardea cinerea*

S. Occupied nests: 24, Brockley Combe, Apr. 29 (P.H., B.K.); 18, Uphill Grange, May 2 (C.E.R.) and three, Newton St. Loe, on 10th (J.W.W.).

MALLARD *Anas platyrhynchos*

G. and **S.** Counts from the New Grounds, the reservoirs, Weston and Sand Bay show peak total of 3,800, Jan. 14, falling to 2,200, Feb. 18, and 1,100, Mar. 18. Autumn counts generally higher than in spring but not reaching January level—2,200, Sept. 16; 2,900, Oct. 14 and 2,650, Nov. 18 increasing to 3,300, Dec. 16, due to sharp rise in numbers at New Grounds from 1,420, Nov. 18, to 2,060, Dec. 16 (various observers).

Cold spring and low water levels made breeding season late and less successful than in 1960 and 1961, Chew Valley res., where 30 – 35 broods seen (B.K. *et al.*). Other brood counts: Blagdon—six (R.J.P., B.E.S.); Litton—eight (S.E.C.); Newton Park—two plus nest with eggs (J.W.W.); Weston Bay—two (R.A.) and Sand Bay—one (R.A.). Breeding records also from Midford, Bath (K.A.H.); Walton Moor nr. Clevedon (P.G.H.) and The Denny (Mon.) (Res. Stn.).

A bird ringed (AJ25977), Slimbridge, 21/4/60 and released, Debach, Wickham Market, Suffolk, 10/5/60, was shot, Tickenham Moor, 180m. W.S.W., 13/1/62 (per H.R.H.).

TEAL *Anas crecca*

G. New Grounds: high Dec. 1961 level (cf. *Proc. B.N.S.*, 1961, p.247) not maintained, numbers falling 40% to 1,000, Jan. 14, and only 40 present, Feb. 18; max. autumn counts—390, Sept. 16 and 350, Dec. 16 (H.J.B., M.A.O.).

S. Barrow Gurney, Blagdon, Cheddar and Chew Valley resrs.: marked influx after cold spell—1,865, Jan. 14, but only 660, Feb. 18; peak autumn counts of 1,460, Nov. 18, and 1,660 ± 125, Dec. 16 (S.I.B., P.J.C., C.L., W.J.S. *et al.*).

GARGANEY *Anas querquedula*

G. One in W.T. enclosures, New Grounds, Sept. 1 (M.A.O.).

S. Four (3♂♂), Blagdon res., Mar. 17 (J.R.B., C.L.) and single male, Cheddar res. on 25th (P.H., B.K.). Two pairs, Chew Valley res., Mar. 18, 25 (G.C.B., S.I.B.) and single male, Apr. 14 – 19 (G.G.C., W.L.R. *et al.*) ; up to five (3♂♂), same place, during May and pair bred (♀ with 4 ducklings, Aug. 8) (R.M.C., B.K.), with unmated male also present, June – August (B.K., M.A.W. *et al.*).

GADWALL *Anas strepera*

S. Present throughout year, Chew Valley res., with at least six pairs during breeding season ; three bred successfully but broods very small—total five ducklings (R.A., B.K. *et al.*). Autumn counts, same res. : 27, Sept. 15 (R.A.) ; 30, Oct. 14 (J.R.P., K.B.Y.) ; 52, Nov. 10 (B.K.) ; and 21, Dec. 16 (P.H., B.R. *et al.*). Noted, Blagdon res., Jan. – Feb. and Nov. – Dec., with max. counts of eight, Feb. 8 (W.L.R.) and six, Dec. 16 (P.J.C.).

WIGEON *Anas penelope*

G. Counts from the Estuary, New Grounds, include : 2,250, Jan. 14 but only 340, Feb. 18 ; 380, Oct. 14; 1,050, Nov. 18 and 2,100, Dec. 16 (H.J.B., M.A.O.).

S. Reservoir counts : total of 1,765, all waters, Jan. 14 ; 1,175, Feb. 18, and 900, Mar. 18. Thirty, Chew Valley, Apr. 19, and two pairs still present, June 7, 11, and single male, July – August. Autumn build-up from 300, all waters, Oct. 14 to 1,125, Dec. 16, with increase at onset of hard weather to at least 1,430, Chew Valley on 26th (various observers).

PINTAIL *Anas acuta*

G. New Grounds—Estuary and W.T. enclosures : 200, Jan. 14 ; 55, Feb. 18 ; max. autumn counts—95, Nov. 18, and 142, Dec. 16 (H.J.B., M.A.O.).

S. Numerous records from reservoirs but mostly of less than ten birds—max. counts : 30, Chew Valley, Jan. 2 (J.R.B., C.L.) and 49 on 14th (G.C.B., S.I.B.) ; 36, same res., Oct. 21 (B.K.) ; 40, Cheddar, Jan. 20 (T.B.S.). Thirty, flooded pasture, Stoke Moor, nr. Cheddar, Feb. 4 (J.A.McG.).

SHOVELER *Spatula clypeata*

G. Principal counts, W.T. enclosures and Estuary, New Grounds : 40, Jan. 14 ; 50, Nov. 18, and 43, Dec. 15 (H.J.B., M.A.O.).

S. Much less numerous than in recent years. Highest numbers again at Chew Valley res., where four broods located, June/July (R.A., B.K.). Total of 130, all waters, Feb. 18, and 210, Oct. 14 (but 219, Chew Valley, Nov. 10) (B.K.B., G.C.B., P.H. *et al.*). Coastal records: seven, Yeo Estuary, Jan. 6 (J.R.B., C.L.); pair, Sand Bay, Mar. 11, and Woodspring Bay, May 5 (T.B.S.).

Red-crested Pochard *Netta rufina*

S. Party of three (1♂), Cheddar res., Nov./Dec. 1961, remained till Jan. 21 (P.H., B.K. *et al.*); three (2♂♂), same res., Oct. 14 – Dec. 2 (R.A., J.A.McG., M.A.W. *et al.*).

Scaup *Aythya marila*

S. Single male, Cheddar res., Jan. 14 – Mar. 31 (J.R.B., R.M.C. *et al.*); five (1♂), same place, Nov. 18; two, Dec. 2 and one, Dec. 16 – 26 (J.A.McG.). Single male, Blagdon res., Feb. 11, Aug. 5 (J.R.B., C.L.); Chew Valley res., Apr. 14 – May 20 (P.J.C., M.A.W. *et al.*) and Barrow Gurney resrs., Sept. 24 – 26 (T.B.S.)—may well have been same bird moving about between the reservoirs [Eds.]. Female, Chew Valley res., June 7 (B.K.).

Tufted Duck *Aythya fuligula*

G. Evening flighting from Frampton gravel pits to W.T. enclosures, New Grounds, continued into March (max.—152, Feb. 2): similar behaviour noted, October to end of year, with max. of 100, Dec. 12 (L.P.A., M.A.O.).

S. Large increase, Dec. 1961, only temporary and numbers down to 400, Jan. 14 (various observers). Spring influx again occurred, Chew Valley res., with peak count of 575, Apr. 28 (B.K.); 338, same res., May 12 and 394 on 26th, falling to 300 in June and 175 in July (B.K.). Autumn reservoir counts totalled 580, Oct. 14, and 615, Dec. 16 (C.L., J.F.R., W.J.S. *et al.*). Poor breeding season due to low water levels—only 7 broods, Chew Valley (R.A., R.M.C., B.K., W.L.R.) and one, Blagdon (R.M.C.). Three birds, R. Avon, Saltford, Dec. 28 (P.H.) and six on 30th (B.K.).

Pochard *Aythya ferina*

S. Very marked reduction in winter population after severe weather, end Dec. 1961/early Jan. 1962. Total all reservoirs—448, Jan. 14, falling to 150, Feb. 18, and 75, Mar. 18. Up to twelve, Chew Valley res., during summer but no evidence of breeding. Autumn build-up from early Sept., numbers reaching 600+, Oct. 13, doubling by end of month with further increase to 1,600, Nov. 18 and 1,525 ± 100, Dec. 16 (various observers)—majority of these at Cheddar res., where 70% – 80% were males (J.A.McG.

et al.). Cold weather counts: 1,700, Cheddar res., Dec. 26 (J.A.McG.); 50, R. Avon, Saltford, Dec. 28 and 133 on 29th (P.H.), but only 12 on 30th (B.K.).

GOLDENEYE *Bucephala clangula*

S. Most cold weather immigrants of Dec. 1961 left area early in year—only fifteen present, Jan. 14. February/March total (*c.*20) lower than previous three years. Highest spring count—40, Chew Valley, Apr. 14 (J.R.B., C.L.). Autumn counts, all reservoirs: eight, Nov. 18, and 20, Dec. 26 (various observers).

LONG-TAILED DUCK *Clangula hyemalis*

S. Female, Barrow Gurney resrs., Mar. 5 – May 2 (C.L., T.B.S.) and immature, Chew Valley res., Dec. 15 – 19 (N.J.C., R.M.C., B.K.).

COMMON SCOTER *Melanitta nigra*

G. Three, Berkeley ship canal, Slimbridge, Nov. 18 – 30 (H.J.B., M.A.O.).

S. Male, R. Avon, Saltford, Mar. 31 (P.H., B.K.). Single bird, Weston Bay, Apr. 20, 22 (R.A.) and five, Nov. 29 (S.I.B.).

GOOSANDER *Mergus merganser*

S. Reported only from reservoirs: female, Blagdon, Jan. 7; single pairs, Chew Valley, Jan. 7 – Apr. 12 and Cheddar, Jan. 14 – Mar. 18 (P.J.C., P.H., M.A.W. *et al.*); also scarce in autumn—single birds, Cheddar, Nov. 24 (R.M.C.), Chew Valley, Dec. 1 – 23 (B.R. *et al.*), but numbers increased at onset of hard weather to total of 14, Dec. 26 (four, Blagdon; one, Cheddar; 9, Chew Valley) (S.E.C., R.J.L., H.A.T. *et al.*).

SMEW *Mergus albellus*

S. Up to four (1♂), Chew Valley res., Jan. 1 – Mar. 24 (S.I.B., G.G.C. *et al.*); also present, same res., Nov. 10 to end of year, with max. of seven (1♂), Dec. 16 (P.J.C. *et al.*). "Redhead", Cheddar res., Dec. 2, and male on 26th (J.A.McG.).

NORTH AMERICAN RUDDY DUCK *Oxyura jamaicensis*

S. Up to six (4♂♂), Chew Valley res., various dates, Jan. – May (E.G.M.N., I.H.S. *et al.*) and pair with fully grown juvenile, June 30 (B.K.); five, same place, Nov. 4, and seven, Dec. 1 (R.M.C. *et al.*). Two males, Blagdon res., Jan. 7, Feb. 3, and pair on 11th (J.R.B., C.L., T.B.S.).

SHELDUCK *Tadorna tadorna*

G. Max. counts, New Grounds: 54, Mar. 18; 120+7 juvs., June 24; 276 + 20 juvs., July 17; 35+30 juvs., Aug. 9, and 53+45 juvs. on 20th (L.P.A.).

S. Pair with ten ducklings, Chew Valley res., June 14—all believed to have been taken by Lesser Black-backed Gulls (B.K.). Coastal survey, Avonmouth to Weston-s-Mare, continued by members of Ornith. Section: 370 ads. and 217 young (*c*.30 broods) present, third week June (per S.M.T.). Autumn coastal counts include: 270, Sand Bay and 178, Weston Bay, Nov. 18, but only 55 at each site, Dec. 16 (R.A.).

GREYLAG GOOSE *Anser anser*

G. Single bird with White-fronted Geese, New Grounds, Mar. 11 (L.P.A., M.A.O.).

WHITE-FRONTED GOOSE *Anser albifrons albifrons*

G. New Grounds: total of 1,800 at end of previous Dec. fell rapidly in hard weather to 300, Jan. 2 and to only 50 on 4th. Milder conditions resulted in an immediate increase to 1,860, Jan. 10 and 3,500 on 18th, numbers rising to peak total of 4,400, Feb. 12; 3,500 still there, Mar. 9 but only 150 on 14th—the last (ten) being seen two days later (W.T.). Autumn arrivals, same place, unusually late: seven, Oct. 11 and 51 on 17th but increase to 270, Dec. 1; 1,450 on 21st and 3,000 at close of year (W.T.). Fifty-five overhead, Clifton, Dec. 29 (P.J.C.) and *c*.50 over Southmead on 31st (R.H.P.).

S. Reported from widely scattered places in hard weather, early Jan.—notably from Chew Valley res. (flocks of 30 to 70 (S.I.B., B.K., G.S.)). Numbers, varying from half a dozen to 150, seen in same period at Cheddar (J.A.McG., B.R.) and Weston-s-Mare, Sand Bay and Wick St. Lawrence (R.A., T.B.S.). Sixty over Nailsea, Jan. 20 (R.F., T.R.J.W.). December records (max. flock 60) from Chew Valley res., Sand Bay, Saltford and Hutton (R.M.C., S.E.C., P.H. *et al.*).

GREENLAND WHITE-FRONTED GOOSE *Anser albifrons flavirostris*

G. One among typical birds, New Grounds, Dec. 9 (B.K.), 21 (H.J.B.).

BEAN GOOSE *Anser fabalis*

G. First-winter bird among White-fronts, New Grounds, on three dates, early Feb.; this was probably a Russian Bean Goose (*A. f. rossicus*) and not an example of the typical form (H.J.B., M.W.H., C.E.H.S.).

PINK-FOOTED GOOSE *Anser brachyrynchus*

G. New Grounds : absent early in year apart from single bird seen, Jan. 22 (W.T.). Autumn arrivals, same place : party of 28 as early as Sept. 18—number increasing to max. of 62, Nov. 29 ; 61 still there, Dec. 21, but only two remaining on 30th (W.T.).

BRENT GOOSE *Branta bernicla*

S. Single ad. (dark breasted), Axe Estuary, Feb. 3, 4 (R.A.) and three (race ?) on sea, and in flight, off Brean Down, on 17th (H.G.H.).

BARNACLE GOOSE *Branta leucopsis*

G. One, New Grounds, Jan. 9 ; four, same place, on 20th, and seven, Feb. 3, 12 (W.T.).

CANADA GOOSE *Branta canadensis*

S. Reports of over 40 (max. 48), Chew Valley res., various dates, Jan. 6 to 21 (S.I.B., P.H., B.K. *et al.*) evidently refer to wild birds (W.T. records no movement from the stock at Frampton-on-Severn (Glos.) and N.J.C. says " the birds appeared particularly wary of any approach "). Single bird on margin, Blagdon res., Jan. 9 (B.R.).

WHOOPER SWAN *Cygnus cygnus*

S. Blagdon res.: twelve, Jan. 14 (B.K.B.); four, Nov. 3 (R.M.C., B.K., G.S.) ; 20, Nov. 4 (G.S.) ; 18, Nov. 11 (J.W.W.) and eleven on 18th (C.L.). Eight, Chew Valley res., Nov. 11 (P.J.C., M.A.W.). Two, Stoke Moor, nr. Cheddar, Dec. 4 (J.A.McG.).

BEWICK'S SWAN *Cygnus columbianus bewickii*

G. New Grounds (birds often in W.T. enclosures): 23, Jan. 11 ; one, caught and ringed, Feb. 15 ; 39, Mar. 13 ; fifteen on 22nd ; up to 22 in Nov. ; 32, Dec. 26 (many observers).

S. Blagdon res.: nine, Jan. 7 (P.H., B.K.) ; twelve, Jan. 13 (B.K., T.B.S.) ; up to 45, Feb. 18 – Mar. 11 (various observers) ; two, Apr. 7 (C.L.) ; five, Oct. 29 (G.G.C.) ; up to 19, Nov. 3 – Dec. 16 (many observers) ; 28 flying W. and, half an hour later, 16 flying E., Dec. 22 (R.A.). Cheddar res. : eighteen, Feb. 18 ; 19, Nov. 11, and six, Dec. 26 (J.A.McG.). Chew Valley : not seen until Nov.—four on 10th ; nine on 18th (B.K.) and up to 24, Nov. 24 – Dec. 26 (many observers).

BUZZARD *Buteo buteo*

G. Single bird, Winterbourne, Feb. 3 (R.H.P.) ; nest, with one young bird, located nr. Marshfield (A.A.C.).

S. Nest with one young, nr. Bath, June 3 (K.A.H.). Other breeding season records from Portbury, Charterhouse, and Flax Bourton.

SPARROWHAWK *Accipiter nisus*

G. and **S.** Breeding season records from Sea Mills, Sheperdine, Oldbury, Leigh Woods, Long Ashton, Bishop Sutton, and Midford, nr. Bath. Adult with two young, Blagdon, Aug. 12 (B.K.).

HEN HARRIER *Circus cyaneus*

S. Female or immature, Sand Point, Dec. 2 (R.A.).

MONTAGU'S HARRIER *Circus pygargus*

S. Immature bird, Chew Valley res., Aug. 4 (B.K.).

HOBBY *Falco subbuteo*

G. Single birds, New Grounds, May 12, Aug. 15 (L.P.A.); juvenile, same place, Sept. 19 (H.H.D.). One over Clifton, May 29 (G.S.).

S. Pair reared two young (later ringed) (L.T.) ; adult and one fledged young seen near same nest site, Sept. 9 (G.S., M.A.W.). Single birds, Blagdon, June 3 (R.M.C.), Aug. 18, 30 (P.J.C., M.A.W.) ; Saltford, June 10 (P.H.), 15 (B.K.) ; Chew Valley res., July 22 (R.M.C.), Sept. 16 (W.J.S.) ; Cheddar res., Aug. 26 (J.A.McG.).

PEREGRINE *Falco peregrinus*

G. Single birds, Hotwells, Bristol, Jan. 4 (M.A.W.) ; Clifton, May 22 (G.S.) ; New Grounds, Oct. 1, Nov. 24, Dec. 14 (L.P.A., H.J.B., B.K., M.A.O.).

S. Two, ad. and imm., Chew Valley res., Jan. 14 – Feb. 10 (R.M.C., B.K., G.S., M.A.W.) ; up to three (two ads. and one imm.), same place, various dates, Aug. 11 – Oct. 27 (R.A., R.M.C., B.K., T.D.H.M.). Single birds, Sand Bay, Feb. 11 (R.A.); Brean Down area, Feb. 18 (H.G.H.), Mar. 5 (R.A.), Apr. 13, Oct. 13 (E.M.P.); Portishead, July 14 (J.F.B.). and Saltford, Aug. 17 (P.H.).

GYR FALCON *Falco rusticolus*

S. The bird first reported, Nov., 1961, Chew Valley res., was still present Jan. 6, 7 (R.M.C., P.H., B.K., G.S. *et al.*) and was last seen on 13th (W.J.S.).

MERLIN *Falco columbarius*

S. Chew Valley res. : one, Jan. 7, 20, Feb. 5, 10 (H.H.D., C.L., G.S.) ; ad. male, Feb. 11 (G.S.) and Apr. 29 (B.K.), and single birds, Oct. 8 (P.G.H.), 21 (G.S.), Nov. 25 (W.J.S.). One, Wick St. Lawrence, July 16 (T.B.S.).

RED-LEGGED PARTRIDGE *Alectoris rufa*

S. Pair, Brean Down, May 20 (J.R.B.).

QUAIL *Coturnix coturnix*

G. At least three calling, Marshfield, June 12 (H.W.N.) and two on 29th (R.M.C.).

WATER RAIL *Rallus aquaticus*

G. New Grounds : one caught and ringed, Apr. 12 ; further five ringed, Oct. 1 – Dec. 12 (M.A.O.). Freshly dead birds, Thornbury, Sept. 20 (T.D.H.M.) and Easter Compton, Oct. 12 (W.F.V.). One, perhaps two, Oakford, nr. Marshfield, Dec. 24, 30 (A.A.C.).

S. Single birds, Chew Valley res., Jan. 2 (J.R.B.), Mar. 3 (R.A.), July 31 (J.R.B.); two, same place, Dec. 2 (P.J.C.) ; one calling nr. Cheddar res., Nov. 3 (B.R.). Twelve flushed from *Spartina* beds by rising tide, Sand Bay, Feb. 7 ; single bird, Axe Estuary, Feb. 11 (T.B.S.).

CORNCRAKE *Crex crex*

G. and **S.** Two, nr. Butcombe, May 10 (R.L.) and single bird, Sand Point, on 13th (R.A.). Present in Saltford area, June – Aug. ; one calling nr. Bitton, Sept. 1 (P.T.S.).

COOT *Fulica atra*

S. Reservoirs : peak counts, Cheddar, 2,800, Jan. 14 and 3,000, Dec. 26 (J.A.McG.) ; poor breeding season, Chew Valley, fewer than 20 broods seen (max. winter count, same place, 2,700, Dec. 16 (B.K.)) ; 113, Blagdon, July 7 (G.S.). Twelve on R. Avon, Saltford, in hard weather, Dec. 30 (B.K.).

OYSTERCATCHER *Haematopus ostralegus*

G. Three, New Grounds, Mar. 23, Apr. 18, Sept. 14 (L.P.A., H.J.B.).

S. Three, Blagdon res., Mar. 11 (P.J.C., M.A.W.) and one, sometimes two, Chew Valley res., July 25 – 31 (various observers). Max. coastal count, 90+, Weston Bay, Sept. 17 (R.A.).

LAPWING *Vanellus vanellus*

S. Bird ringed, Pill, 16/1/61, recovered 950m. S., nr. Nava (Oviedo), Spain, –/1/62 (M.J.B.). Strong S.—S.W. movement noted during hard weather, early Dec.; at least 800 over Nailsea on 7th (M.V.T.) and birds moving at rate of 900 an hour over Cheddar res. on 8th (R.A.).

RINGED PLOVER *Charadrius hiaticula*

G. Max. counts, New Grounds : 100, May 31, and 300, Aug. 22 (L.P.A., M.A.O.). 200 on coast nr. Hallen, Aug. 19 (H.W.N.).

S. Usual autumn records from reservoirs, with max. total of 91, Chew Valley, Aug. 29 (R.M.C., B.K.). Highest coastal count, 150, Sand Bay, Sept. 2 (R.A.).

LITTLE RINGED PLOVER *Charadrius dubius*

S. Chew Valley res. : one, Apr. 7 (R.A.) ; three imms., July 11 (R.M.C.) ; two, Aug. 4 (R.A.) and single birds, Aug. 8 – 12 (R.M.C., B.K., J.A.McG.).

GREY PLOVER *Charadrius squatarola*

G. New Grounds : up to five, May 6 - July 17 ; 40, Aug. 29 (L.P.A.).

S. Four, Yeo Estuary, Feb. 18 (J.R.B., C.L.) ; two, Sand Bay, Apr. 29 ; one, Axe Estuary, Sept 23 (R.A.). Reservoirs : single birds, Blagdon, Sept. 30 (B.R.) ; Cheddar, Oct. 7 (J.A.McG.) ; two, Chew Valley, Oct. 13 (J.A.McG.) and one, Dec. 2 (G.S.).

GOLDEN PLOVER *Charadrius apricarius*

G. Max. count, New Grounds—150, Dec. 23 (L.P.A.).

S. Axe Estuary area : 50, Jan. 28 (T.B.S.) ; 100, Oct. 20 and 200, Dec. 1 (R.A.). 250 on ploughed field nr. Bath, Jan. 28 (R.M.C.) ; up to 80 or more, Chew Valley res., Oct. 21 – Dec. 23 (various observers) ; 60, Bristol Airport, Dec. 5 (T.B.S.).

TURNSTONE *Arenaria interpres*

G. Four, New Grounds, Aug. 1 (L.P.A.). At least 300, Severn Beach, Aug. 19, and 200, Sept. 1 (I.H.S.). Forty, Oldbury, Oct. 20 (J.D.R.V.).

S. Single bird, Kingston Seymour, July 28 (R.M.C.). Up to five, Sand Bay—Weston Bay area, Sept. 10 – Dec. 15 (R.A.). One, Chew Valley res., Aug. 25 (R.A.) and two, Sept. 16 (W.J.S.). Single bird, Cheddar res., Sept. 9 (R.M.C.).

JACK SNIPE *Limnocryptes minimus*

S. Two nr. Hutton, Feb. 25 (W.L.R.). Six, Chew Valley res., Oct. 21 and at least 15 on 30th (J.R.B., C.L.) ; six, same place, Dec. 10 (B.R.). Single bird nr. Yatton, Dec. 10 (H.H.D.).

WOODCOCK *Scolopax rusticola*

S. Three flushed, Weston Woods, Dec. 29, 30 (R.A.).

CURLEW *Numenius arquata*

G. Migrant flocks moving N.E. over Downend, Bristol, during darkness, Mar. 29—calls heard for ten minutes or more (R.H.P.). 500, New Grounds, July 7, Aug. 22 (L.P.A., M.A.O.).

S. 300, Sand Bay, Jan. 28 ; 200, same place, Sept. 2 (R.A.). Chew Valley res.: occasional, all seasons (max. nine, June 14) (various observers).

BLACK-TAILED GODWIT *Limosa limosa*

G. New Grounds : 34, July 22, and up to 40, Aug. – late Sept. (L.P.A.).

S. Chew Valley res.: two, Apr. 8, 29 (R.M.C. *et al.*) ; 11 on 30th (J.R.B., C.L.) and single birds, May 26 – June 11, July 14, Aug. 28 – Nov. 7 (many observers). One, Blagdon res., Sept. 16 (J.R.B., C.L.), Nov. 3 (R.M.C.). About 360, Sand Bay, Apr. 29 (R.A.) (see following species, same date). Four, Yeo Estuary, July 29 (J.R.B., C.L.).

BAR-TAILED GODWIT *Limosa lapponica*

G. New Grounds : five, Apr. 19 ; exceptional gathering of 726, Apr. 29 (birds arriving from S. during day and moving off N. in late afternoon) ; only 58 counted on following day ; eighty, same place, May 2 ; 27, Aug. 15 and eight, Sept. 19 (L.P.A., H.H.D.).

S. Counts, Weston Bay—Sand Bay area : nine, Jan. 13 (R.A.); 54, Apr. 15 ; 45 on 29th (T.B.S.) ; six, July 29 (C.L.) and up to five, Sept. 10 – Dec. 16 (R.A., T.B.S.). Chew Valley res.: three, Apr. 29 ; six on 30th and May 2 (J.R.B.), and ten or more, Aug. 26 (I.H.S.).

GREEN SANDPIPER *Tringa ochropus*

G. Up to four, New Grounds, Aug. 9 – Sept. 17, and two, Oct. 2 (L.P.A.). Two, Littleton brickworks, Aug. 24 (J.D.R.V.).

S. Reservoirs : one, Barrow Gurney, Mar. 17 (J.R.B., C.L.) ; one, sometimes two, same place, Apr. and Aug. (various observers) ; usual records, Apr. – Sept., from Blagdon, Chew Valley and Cheddar, with max. of 24, Chew Valley, July (many observers) and 39, same place, Aug. 3 (C.L.). Single birds over Shipham, Aug. 3, Dec. 31 (T.B.S.) and at Saltford sewage farm, Sept. 30, Oct. 7 (P.T.S.). One, Wick St. Lawrence, Apr. 15 (T.B.S.) ; one, sometimes two, Yeo Estuary, July 29 – Sept. 1 (J.R.B., C.L., T.B.S.).

WOOD SANDPIPER *Tringa glareola*

G. Single birds, New Grounds, June 3, Aug. 20, 21 (L.P.A., M.A.O.).

S. Chew Valley res.: one, July 29 ; four, Aug. 8 ; five on 22nd (R.M.C., B.K.) ; up to four to end of month (J.F.B., R.M.C., B.K.) and single birds, Sept. 2 (N.J.C.), 9 (I.H.S.) and Oct. 5 – 11 (N.J.C., R.M.C., G.S.). Single birds, Cheddar res., Aug. 23 (J.A.McG.) ; Blagdon res., Aug. 25 (R.A.), 30 (P.J.C., M.A.W.).

REDSHANK *Tringa totanus*

S. Breeding season records : nine pairs, Chew Valley res., Apr. 19 (B.K.)—nest with three eggs found, May 13 (W.J.S.) and pair with fully grown young bird, June 11 (B.K.). Two pairs, Portbury, Apr. 28 (W.J.S.). Pair with young, Woodspring Bay, June 29 (W.L.R.).

SPOTTED REDSHANK *Tringa erythropus*

G. Eight, New Grounds, July 17 ; nineteen, Sept. 25 ; ten, Oct. 3 (L.P.A.).

S. Two, Chew Valley res., Mar. 18 (S.I.B.), Apr. 17 (W.L.R.). Unusually numerous at reservoirs in autumn : up to seven, Chew Valley, Aug. /Sept. (various observers) and four, Oct. 6, 7 (R.M.C., B.R.); one still there, Nov. 3 (R.A.) ; two, Cheddar, Aug. 16 (J.A.McG.) ; fifteen, Blagdon, Aug. 30 (P.J.C., M.A.W.) and max. count of 24, Sept. 9 (P.J.C.) ; up to nine, same place, in Oct. (many observers), and two, Nov. 5 (G.S.) ; one, Barrow Gurney, Sept. 5 (T.B.S.). One, Yeo Estuary, Apr. 1 ; five, Aug. 19 and single birds, Aug. 25, Nov. 4 (T.B.S.).

GREENSHANK *Tringa nebularia*

G. New Grounds : one, Apr. 29, and up to seven, July 22 – Sept. 5—often in W.T. enclosures (L.P.A.).

S. Chew Valley res.: one, Jan. 28, Apr. 30 (J.R.B., R.M.C.) ; three, July 20 (T.B.S.) ; max. of 20, Aug. 27 (S.I.B.) ; up to ten in Sept. (various observers) and two, Oct. 21 (R.M.C.). Single birds, Barrow Gurney resrs., Aug. 8, 21 (T.B.S.) ; max. of nine, Cheddar res., Aug. 16 (J.A. McG.) and two, Sept. 9 (R.M.C.). Single birds, Weston Bay—Sand Bay : June 3 (J.R.B.), and July / Aug. (various observers) ; six, Sept. 7 (W.L.R.) and single birds, Sept. 16 – Oct. 7 (R.A., T.B.S.).

KNOT *Calidris canutus*

G. A few (max. 23), New Grounds, Aug. 22 – Sept. 9 ; 40 there, Sept. 19, 21 (L.P.A., H.H.D.).

S. Coastal counts include: 1,000, St. George's Wharf, Jan. 14 (J.F.B.); 2,500, Sand Bay, Jan. 28, and 4,000, Weston Bay, Dec. 1 (R.A.). Immature bird, Chew Valley res., Aug. 16 (B.K.), Sept. 16 (W.J.S.).

PURPLE SANDPIPER *Calidris maritima*

S. One, in flight and calling, over rocks, Sand Point, Feb. 25 (T.B.S.)—full details supplied.

LITTLE STINT *Calidris minuta*

G. New Grounds: single bird, May 31; two, Aug. 15; seven, Sept. 30; three, Oct. 13 and one on 14th (L.P.A., H.J.B.).

S. Two, Chew Valley res., Sept. 8, 9 (J.A.McG., T.B.S.) and single birds, Oct. 7 (W.J.S.), Nov. 3 (R.A., T.B.S.). One, Cheddar res., Sept. 22 (B.K.).

TEMMINCK'S STINT *Calidris temminckii*

S. Single bird, Chew Valley res., Sept. 8 (E.M.P.), 9 (S.E.C., J.A.McG., T.B.S.)—full details received.

DUNLIN *Calidris alpina*

G. and **S.** Max. counts, New Grounds: 1,500, May 10; 800, July 18; 2,000, Aug. 22 (L.P.A., M.A.O.). Bird ringed (52627x), Pill, 17/1/61, found dead, same place, 5/1/62, had wing length of 122mm.—a measurement falling within range quoted for northern race, *C. a. alpina* (R.H.P.). Reservoir records include: 21, Chew Valley, Jan. 6 (G.C.B.); eight, Apr. 8; up to 75 in Aug. (many observers) and ten, Dec. 15 (R.M.C.). Max. counts from Cheddar—eleven, Aug. 16 (J.A.McG.) and Blagdon—five, Dec. 16 (R.M.C.).

CURLEW SANDPIPER *Calidris testacea*

G. New Grounds: single bird, Aug. 16; two, Aug. 21, Sept. 15; one, Sept. 24 (L.P.A., M.A.O.).

S. Single birds at Chew Valley res., Apr. 30 (J.R.B.), Aug. 16 – 19 (R.M.C., B.K., J.A.McG.) and Oct. 11 (N.J.C.); and Blagdon res., Sept. 30 (B.R.). One, Weston Bay, Aug. 16 (R.A.).

SANDERLING *Crocethia alba*

G. New Grounds: 100, May 31; up to ten, Aug./Sept. and 20, Oct. 13 (L.P.A., H.J.B., M.A.O.).

S. Weston Bay—Sand Bay: single bird, Mar. 25; up to three in Sept.; single birds, Dec. 1, 2 (R.A.). Two, Chew Valley res., May 10 (J.R.B., C.L.).

RUFF. *Philomachus pugnax*

G. Single bird, New Grounds, Jan. 1 – 4; one, same place, May 6 and up to ten, Aug. – Oct. (L.P.A., M.A.O.). One, Hills Flats, nr. Sheperdine, Aug. 19 (J.D.R.V.).

S. Chew Valley res.: two, Mar. 17 (R.A.); one, Apr. 7, 8 (R.A., R.M.C.); up to six, Aug. 3 – Oct. 11 (various observers); two, Nov. 3; and one, Dec. 8 (R.A.). Single birds, Cheddar res., Aug. 6, 8, 26 (J.R.B., R.M.C., J.A.McG.); two, Blagdon res., Aug. 25 and one, Oct. 14, 20 (various observers). Single birds, Weston Bay, July 29, Dec. 1 (R.A.).

GREAT BLACK-BACKED GULL *Larus marinus*

S. Breeding population on Steep Holm and The Denny (Mon.) totalled 133 pairs (95, Steep Holm; 38, Denny); 86 occupied nests located, Steep Holm, May 26, 27 (Res. Stn.).

LESSER BLACK-BACKED GULL *Larus fuscus graellsii*

S. Bred again, Chew Valley res.—three ads., each with young, June 11; 176 at roost, same place, Dec. 16 (B.K.).

HERRING GULL *Larus argentatus*

S. Thirty nests counted on The Denny (Mon.); eggs and chicks totalled 68, May 24 (Res. Stn.). At least 2,000, Chew Valley res., in late afternoon, Dec. 16 (B.K.).

COMMON GULL *Larus canus*

S. Counts in late afternoon, Chew Valley res., include: 350 – 400, Feb. 5 (G.S.); 2,000 or more, Dec. 16 (B.K.). 500, Weston Bay, Dec. 30 (R.A.).

GLAUCOUS/ICELAND GULL *Larus hyperboreus/glaucoides*

G. Immature bird, Clifton, Feb. 23: watched in flight for several minutes by P.J.C., who records that the entire plumage, including primaries, was pale buff.

BLACK-HEADED GULL *Larus ridibundus*

G. Twenty or more, dead or dying, in severe weather, Eastville Park, Bristol, early Jan.; of sixteen dissected none showed evidence of starvation, main cause of death being congestion and inflammation of the lungs—due probably to chilling (R.H.P.—who records that cold spell was not long enough to produce appreciable loss of weight).

S. Juvenile ringed (3005837), Stoke, Kent, 17/6/56, shot 145m. W., Nailsea, 5/1/62 (H.R.H.). At least 7,000, Chew Valley res., late afternoon, Dec. 16 (B.K.).

KITTIWAKE *Rissa tridactyla*

G. Immature bird, New Grounds, May 8, 19 (L.P.A.).

S. Single ad., Clevedon, Feb. 17 (B.K.); one, Brean Down, Feb. 18 (H.G.H. *et al.*) and dead ad., Sand Bay on 25th (T.B.S.). First-year bird, mouth R. Avon, Apr. 14 (R.H.P.). Single imms., Cheddar res., Aug. 26 (B.K.), Sept. 2, 4 (T.B.S.).

BLACK TERN *Chlidonias niger*

G. Thirty-five, New Grounds, Aug. 14 (L.P.A.).

S. Spring record of ten, Chew Valley res., May 2 (B.K.). Eighty-eight, Chew Valley, July 25 (B.K.); 60, same place, Aug. 17 (J.D.R.V.) and seven, Sept. 5 (R.M.C.). Three, Barrow Gurney resrs., Aug. 20, Sept. 4 (T.B.S.). Up to eight, Cheddar res., various dates, Aug. – Oct. (H.G.A., H.H.D. *et al.*). Two, Blagdon res., Aug. 22 (S.H.G.B., H.W.N.) and three, Sept. 16 (J.R.B., C.L.). One, Axe Estuary, Aug. 15 (R.A.).

COMMON TERN *Sterna hirundo* ARCTIC TERN *Sterna macrura*

G. New Grounds: nine, May 8; one, June 16; two, Aug. 15; five, *hirundo*, on 20th; two, Sept. 5 (L.P.A.).

S. Three, Cheddar res., Apr. 21 (J.R.B.) and Chew Valley res., May 2 (C.L.). One, R. Avon, Saltford, May 6 (P.H.). Return passage, reservoirs, Aug. 18 – Sept. 16 : numbers small with max. of three, Cheddar, Aug. 26 (B.K.) and eleven, Chew Valley, Sept. 2 (W.J.S.).

ROSEATE TERN *Sterna dougallii*

S. One, in full breeding plumage, found dead, Clutton, May 10, was sent to City Museum, Bristol (P. F. Bird); third record for the County—cf. *Proc. B.N.S.*, 1954, p. 27.

LITTLE TERN *Sterna albifrons*

G. Single birds, New Grounds, May 4, 19 (L.P.A.).

S. Two, Chew Valley res., Apr. 21 (W.J.S.) ; one, Cheddar res., same date (J.R.B.).

LITTLE AUK *Alle alle*

G. An unharmed bird found, Charfield, Jan. 12, was taken to the New Grounds and released on the Estuary (M.A.O.).

GUILLEMOT *Uria aalge*

S. One off landing beach, Steep Holm, June 11 (T.B.S.).

STOCK DOVE *Columba oenas*

S. Numbers evidently well maintained. Noteworthy records:

up to 50 on rough ground, Chew Valley res., several dates, Feb. – Mar. (R.A., J.R.B., B.K., C.L.); exceptional flock of 108 on stubble, Charterhouse, Mendip, Mar. 3 (T.B.S.); common along rail track nr. Saltford, July 11 (H.H.D.); one, Steep Holm, Sept. 30 – Oct. 5 (Res. Stn.).

TURTLE DOVE *Streptopelia turtur*

G. and **S.** Breeding season records from Avonmouth (C.L.); Marshfield and Slimbridge (R.M.C.); Keynsham and Saltford (P.T.S.); Chew Valley res. and in Bath area (R.M.C.). Two with Collared Doves, Avonmouth, on exceptionally late date of Nov. 17 (C.L.).

COLLARED DOVE *Streptopelia decaocto*

G. Up to ten feeding on grain around flour mills and rail sidings, Avonmouth Docks, in Mar.—number rising to max. of *c.*50, July, but falling to 30, Nov. (C.L.). Attempted breeding by pair, St. Andrew's Road, Avonmouth, early June (H.G.H.). Shirehampton: present in all months—three pairs having territories but no direct evidence of breeding (C.L.). Other records from Cornwallis Crescent, Clifton: one to three birds, frequent dates, Apr. – Sept., and The Avenue, Stoke Bishop: three, many dates, June – July, and at least two daily, mid-July to mid-Sept. (breeding suspected, both areas) (G.S.). Occasional records from Combe Dingle and Redland (C.L., G.S. *et al.*). Two, Slimbridge (W.T. enclosures), May – Sept. (4, June) (R.M.C., M.A.O. *et al.*).

S. One, Bishop Sutton, Apr. 30 (S.G.M.). One, sometimes two, various urban areas, Weston-s-Mare, late June – late Nov.; one, Redhill, nr. Wrington, Aug. 14, and two on cottage roof, Kewstoke, Oct. 7 (R.A.). Single bird close to Ashton Gate, Bristol, Sept. 2 (G.S., M.A.W.).

NIGHTJAR *Caprimulgus europaeus*

G. and **S.** One flushed from rough ground, Filton golf course, May 16 (R.A.). One "churring", Leigh Woods, soon after 4 a.m., June 19 (J.F.B.).

SWIFT *Apus apus*

G. and **S.** Spring arrivals normal but return passage dates generally later than usual (R.M.C., R.H.P. *et al.*). **S.** Early dates: two, Chew Valley res., Apr. 15 (W.J.S.) and single bird, Barrow Gurney resrs., on 17th (T.B.S.). Passage of *c.*2,500, Chew Valley res., Apr. 30 (J.R.B., E.H.) and up to 3,000 or more often seen over water (usually in stormy weather), same place, mid-May to mid-Aug. (various observers).

LESSER SPOTTED WOODPECKER *Dendrocopos minor*

G. Single birds, Moorend, nr. Hambrook, Apr. 18 (R.H.P.) and Filton golf course, July 16 (R.A.).

S. One, Blagdon res., Feb. 25 (B.K.) and two pairs, Mar. 6 (G.C.B., S.I.B.). One, Tickenham, Mar. 31 (T.R.J.W.) and one, Kewstoke Woods, Apr. 29 (R.A.). Two, Saltford, July 1 (B.K.).

SKYLARK *Alauda arvensis*

G. and **S.** About 2,000 passing W. in hard weather during 45 mins., Filton golf course, Dec. 27 (R.A.) and small groups feeding with finches along foreshore, Chew Valley res., same date (S.E.C.); small parties moving S. in similar conditions, Weston Bay, on 30th (R.A.).

SWALLOW *Hirundo rustica*

S. First spring record: one, Claverton, Bath, Apr. 1 (R.M.C.). Large coastal movements, Brean Down, Apr. 20, 22 (R.A.) and many passing Anchor Head and Sand Bay during an hour's watch, May 1 (R.H.P.). Two ads. and a juv. ringed, Nailsea, in the summer of 1961 were all recovered in same locality between second week of May and mid-September, 1962 (H.R.H.).

SAND MARTIN *Riparia riparia*

S. Breeding (2 pairs) in wall drainage holes, Pulteney Weir, Bath, May 1 (R.M.C., B.K.). Two pairs breeding in bank holes, R. Avon, Saltford, June 30 (P.T.S.).

RAVEN *Corvus corax*

S. Usual breeding pair, Brean Down; two young reared (R.A., E.H., W.L.R.). Inland record of four crossing Chew Valley res. and disappearing toward Litton, Sept. 27 (G.C.B., S.I.B.).

CARRION CROW *Corvus corone*

G. and **S.** Nest (3 eggs) on top ledge, *c.*50 ft., of factory water tank, Filton, May 21 (R.A.). Flock of at least 300, Nailsea Moor, Apr. 28, and 140, May 13 (S.M.T.). Bred, Steep Holm: nest (2 young, 2 eggs) in Elder bush, E. cliff, May 26 (Res. Stn.).

ROOK *Corvus frugilegus*

G. Survey, Severn Vale, 1962: sixty-three Rookeries (1,482 nests) located—a decrease of about 8% on 1956 figures (A.E.B., J.D.R.V.).

JACKDAW *Corvus monedula*

S. Pair leaving hole in barracks roof, Steep Holm, in early morning, May 27; no further observations (Res. Stn.).

Blue Tit *Parus caeruleus*

G. and **S.** Colour-ringed bird trapped, Clifton, Feb. 24, had been ringed there more than six years previously (25/12/55) (P.J.C.). Pair breeding in hole of railway telegraph post, Saltford, June 2 (P.T.S.).

Dipper *Cinclus cinclus*

S. One, Midford Brook, nr. Bath, June 26 (R.M.C.).

Redwing *Turdus musicus*

G. and **S.** Hard weather records, early Jan.: hundreds in garden hedgerows between Ashton Park and Suspension Bridge (Bridge Road) on 1st and some feeding in St. Paul's Road, Clifton (J.F.B.); a few (very tame) feeding in Talbot Road, Knowle, same date (G.C.B.). About 350 on N. side, Chew Valley res., Jan. 13 (P.G.H.). Enormous roost, many thousands, Rowberrow Warren, Shipham, Dec. 15 (T.B.S.) (cf. *Proc. B.N.S.* 1960, 1961). In severe weather, last week Dec., some feeding on apples (still on trees) in garden, Nailsea (M.V.T., S.M.T.), and hedgerows, Hutton Moor, "full of Redwings" (W.L.R.).

Ring Ouzel *Turdus torquatus*

G. Single male, Penpole, Shirehampton, Apr. 8 (H.W.N., J.F.R., K.B.Y.).

S. Party of six, Brean Down, Apr. 4 (S.K.T.) and single bird on 20th (R.A.). Two, Cadbury Camp ridge, Apr. 5 (S.K.T.). Party of five, Farleigh Combe, Backwell, Apr. 8 (R.F.O.), 10 (G.E.C.). One, Sand Point, Oct. 21 (S.I.B.).

Stonechat *Saxicola torquata*

G. Hard weather records of single males, Southmead, mid-Jan. (R.H.P.) and Stapleton, late Dec. (H.G.H.).

S. Pair, evidently breeding, Brean Down, several dates, Mar. – Apr. (R.A., E.M.P., W.L.R.). Pair carrying food, Sand Point, May 13 (R.A.). Off season records from coastal areas and reservoirs (various observers).

Whinchat *Saxicola rubetra*

G. and **S.** Pair feeding young, Nailsea Moor, June 4 (T.R.J.W.). A female, Filton golf course, May 1 (R.A.); a pair on saltings, Uphill, on 3rd (R.A.). A male, Kenn Moor, June 9 (C.L.), and a pair, King Down, nr. Cheddar, July 8 (R.M.C.), may have been breeding birds. Other records, May and Sept.–Oct., from Chew Valley res. and Brean Down (R.M.C., T.B.S.).

REDSTART *Phoenicurus phoenicurus*

G. Pair building in hole of decayed Elm branch, Durdham Down, Clifton, May 1, and a pair feeding young in hedgerow, Hallen Marsh, June 6 (P.G.H.). Two ad. males and four juveniles (just fledged), Oakford, nr. Marshfield, June 3, and pair with young in nest, same place, on 23rd (A.A.C.).

BLACK REDSTART *Phoenicurus ochruros*

G. Female or imm., on Bypass between Filton and Patchway, Jan. 10 (R.H.P.).

S. Female or imm., Brean Down, Mar. 4, 17 (T.B.S.).

GRASSHOPPER WARBLER *Locustella naevia*

S. Single bird "reeling", Brean Down, Apr. 24 (J.R.B.), May 6 (R.A.), 30 (P.G.H.). Three "reeling", Walton Moor, several dates, May – June (P.G.H.).

REED WARBLER *Acrocephalus scirpaceus*

G. and **S.** Breeding, usual site, Littleton-on-Severn, June 20 (P.J.C., G.S., J.D.R.V.); one trapped, same place, July 29, had been ringed there (J57257) as an ad., 1/8/60 (P.J.C.). Reported from widespread localities—notably from reed beds, east side, Chew Valley res., where seventeen pairs located, June 10 (W.J.S.) and twenty singing males counted, July 1 (G.S.).

LESSER WHITETHROAT *Sylvia curruca*

G. and **S.** First arrivals, last week of Apr.: Littleton-on-Severn, Olveston, Chew Valley, Yatton Moor, etc. (P.J.C., H.H.D., J.D.R.V. *et al.*). Breeding season records from **G.**—Filton and Inglestone Common, nr. Hawkesbury Upton and **S.**—Clevedon, Easton-in-Gordano, Yeo Estuary, Saltford and Chew Valley (various observers).

WILLOW WARBLER *Phylloscopus trochilus* CHIFFCHAFF *P. collybita*

G. and **S.** Spring arrivals unusually late, neither being reported in numbers until third week of Apr. (many observers).

WOOD WARBLER *Phylloscopus sibilatrix*

G. Passage bird, Littleton-on-Severn brickworks, Apr. 23 (P.J.C.).

PIED FLYCATCHER *Muscicapa hypoleuca*

G. Male singing in garden, Cornwallis Crescent, Clifton, May 22 (G.S.). Several return passage records from Filton: two seen, Aug. 8; one on 27th and one (perhaps two), Sept. 7 (R.A.).

S. Female, Flax Bourton, Apr. 24 (R.F.O.). Male, Shipham, May 14 (T.B.S.).

HEDGE SPARROW *Prunella modularis*

S. Count of at least 25 pairs, Steep Holm, Apr. 28 – 29 (Res. Stn.). One colour-ringed, Hutton, Jan. 1959, still a regular visitor to same garden at close of 1962 (W.L.R.).

TREE PIPIT *Anthus trivialis*

S. Two pairs bred, Leigh Woods (P.J.C.). Breeding season records (two singing birds in each case) from Ashton Court (J.F.B.); Cadbury Camp ridge (H.H.D.) and Yoxter, Mendip (P.G.H.). Noted on passage at Crook Peak, Brean Down, Kewstoke and Sand Point (various observers).

ROCK PIPIT *Anthus spinoletta petrosus*

S. Six in creek, Pill, R. Avon, Mar. 2 (J.F.B.). Reservoir records: single bird, Chew Valley, Oct. 21 (P.J.C., M.A.W.) and two on 27th (B.K.); two, Cheddar, Oct. 27 (R.M.C.) and one, Nov. 22 (W.L.R.).

WATER PIPIT *Anthus spinoletta spinoletta*

S. Cheddar res.: one, Feb. 4 (J.A.McG.) and Mar. 25 (B.K.); two, Oct. 27 (R.M.C., B.K.) and one, Dec. 15, 16 (B.K., J.A.McG.). Single bird, Chew Valley res., Feb. 10 and on several dates, Mar. (R.M.C., J.A.McG.); up to four, same place, on two occasions, early Apr. (P.J.C., M.A.W.) and up to six on various dates, late Oct. to early Dec. (B.K., W.J.S. *et al.*).

YELLOW WAGTAIL *Motacilla flava flavissima*

S. Breeding or breeding season records from Nailsea and Kenn Moors (H.R.H., S.M.T.); Blagdon res. (G.S.); and Chew Valley res. where W.J.S. counted fourteen pairs, June 9, of which half were feeding young.

WAXWING *Bombycilla garrulus*

S. Two, or more, present, Bath and district, mid-Feb. to late Mar.—one, sometimes two, being seen, various dates, Lansdown, Victoria Park, Upper Weston, etc. (R.M.C., P.H., B.K., P.T.S.).

STARLING *Sturnus vulgaris*

G. One ringed (410185), Eastville, Bristol, 31/12/61, recovered 2,300m. N.E., nr. Podporozkye, Leningrad, 17/8/62 (per Moscow Ringing Bureau).

S. Three nests with young in barracks roof, Steep Holm, May 26 (Res. Stn.).

HAWFINCH *Coccothraustes coccothraustes*

S. Single bird, Victoria Park, Bath, several occasions, Mar. 4 – 11 (R.M.C., P.H., P.T.S.). Two pairs, Leigh Woods, May 15 (P.J.C.).

GREENFINCH *Chloris chloris*

G. and **S.** First-winter female ringed (22116S), Downend, Bristol, 14/3/62, killed by a cat, 85m. E., nr. Godalming, Surrey, 1/5/62 (R.H.P.). Male ringed (22571X), Corston, nr. Bath, 21/2/60, recovered in a bale of straw, 100m. N.E., Souldrop, Beds., 17/4/62 (R.H.P.). Flock of *c.*200, Charterhouse, Mendip, Mar. 3 (T.B.S.). 300 or more, with other finches, Chew Valley res., Mar. 17, and nr. Cheddar Gorge, Apr. 21 (R.A.).

GOLDFINCH *Carduelis carduelis*

G. and **S.** Flock of 60, Filton golf course, Oct. 18 (R.A.). Chew Valley res.: large flocks reported—250, Feb. 11 and 200, Mar. 4 (W.J.S.); 450, Sept. 23 (T.D.H.M.) and Oct. 7 (W.J.S.). One, juv., ringed (AA85952) nr. Thornbury, 30/7/61, recovered 260m. S., nr. Vannes, Brittany, 28/12/62 (J.D.R.V.).

SISKIN *Carduelis spinus*

G. Up to seven, New Grounds, various dates, Jan. 5 to Feb. 24 (L.P.A.). Sixteen in alders, Oakford, nr. Marshfield, Dec. 24, 25 (A.A.C.). At least eight, R. Frome, Fishponds, Dec. 25 (R.H.P.).

S. Noted, Saltford, various dates, mid–Jan. to mid–Apr. (P.H., B.K., P.T.S.)—usually only one to three but fourteen counted in alders, Jan. 20 (P.H.). Coastal reports, chiefly of very small numbers, from Brean Down, Jan. 28 and Axe Estuary, Feb. 11 (T.B.S.); Sand Point and Wick St. Lawrence, early to mid-Oct. (R.A., T.B.S.). Autumn records of single birds, heard or seen, from Blagdon res. and Shipham (R.A., T.B.S.).

LINNET *Carduelis cannabina*

S. Nest with three eggs and a Cuckoo's egg, Kewstoke, May 13 (R.A.). Various flocks (1,000 birds in all), Chew Valley res., Sept. 23 (T.D.H.M.).

LESSER REDPOLL *Carduelis flammea cabaret*

G. Two, New Grounds, Oct. 18; forty flying S., same place, Nov. 24 (L.P.A.). Half a dozen, with Siskins, Oakford, nr. Marshfield, Dec. 24, 25 (A.A.C.).

S. Two, Saltford sewage farm, Feb. 18 (P.H.); two, same place, Apr. 9, 10—one clearly a Lesser Redpoll and the other (larger and in paler plumage) probably belonged to one of the larger races (R.M.C., P.H.).

CROSSBILL *Loxia curvirostra*

G. Up to twelve, Westonbirt Arboretum, several dates, Nov. (A.M.G.C., B.C.).

S. Party of eight or ten, Westpark Wood, Clapton-in-Gordano, July 3 and single bird, various dates to early Nov. (H.H.D.). Six in fir plantation, Barrow Gurney resrs., July 31 (T.B.S.).

CHAFFINCH *Fringilla coelebs*

S. Ad. female ringed, Corston, nr. Bath, 20/2/60, recovered 95m. S.W., Plympton, Devon, 2/2/62 (M.J.B.). Of two ad. males ringed, Saltford, 4/2/62, one was recovered 1,400m. N.E., Averöy Is., Norway, 25/5/62, and the other 350m. S.E., East Flanders, Belgium, 9/10/62 (Mendip Ringing Group). Male, Victoria Park, Bath, seen on three occasions attacking its own reflection in hub cap "mirrors" of a parked car (R.M.C.).

BRAMBLING *Fringilla montifringilla*

G. and **S.** Frequently reported from both coastal and inland areas. About 50, with Chaffinches, Green Ore, Mendip, Mar. 3, 25 (B.R.). Early autumn date: one in birch tree, Westbury Road, Bristol, Sept. 11 (N.J.C.).

CORN BUNTING *Emberiza calandra*

S. Up to three singing males, Yoxter, Mendip, various dates, May (P.J.C., M.A.W.); birds noted there also, June, Aug. (R.A., P.G.H.). Two singing males, Saltford, May 11 (B.K.) and one in song, Lansdown, Bath, June 21 (R.M.C.).

CIRL BUNTING *Emberiza cirlus*

G. Heard or seen, Horseshoe Bend, Shirehampton, several dates, May – June; female feeding three fledged young, same place, June 24 (P.G.H.).

S. Reported (mostly in breeding season) from Cheddar, Nailsea, Portishead and Sand Bay (various observers). Less common in Uphill – Bleadon area than several years ago (R.A.).

Snow Bunting *Plectrophenax nivalis*

G. Single bird, New Grounds, Dec. 31 (L.P.A.).

S. Two on sea wall nr. Clevedon, Jan. 6 (J.R.B., C.L.); single bird in flight and calling, Axe Estuary, on 13th (R.A.).

Tree Sparrow *Passer montanus*

G. Flock of 35, Hanham, Apr. 14 (E.H.). Occasional records (summer and winter) from W.T. enclosures (R.M.C., B.K.). Pair feeding fledged young nr. Filton golf course, July 12 (R.A.). Exceptional number of *c.*200 in field, Aust Cliff, Aug. 18 (H.W.N., J.F.R.).

S. Several, Nailsea Moor, Feb. 17 (C.L.). Party of *c.* twenty, Ubley, Mar. 14 (P.H., B.K.). Pair breeding in orchard, Chew Valley res., Apr. 21 (W.J.S.); family parties (14 birds), same locality, July 30 (S.I.B.). Brood of fledged young being fed, East Horrington, nr. Wells, July 9 (B.R.). Other breeding season records from Backwell (R.F.O.); Kewstoke and Wick St. Lawrence (T.B.S.); and Walton Moor (J.F.B.).

Species Reported during the year but not included in the Systematic List:—

Residents: Little Grebe, Cormorant, Mute Swan, Kestrel, Partridge, Pheasant, Common Snipe, Barn Owl, Little Owl, Tawny Owl, Kingfisher, Green Woodpecker, Great Spotted Woodpecker, Magpie, Great Tit, Coal Tit, Marsh Tit, Long-tailed Tit, Treecreeper, Wren, Song Thrush, Goldcrest, Meadow Pipit, Pied Wagtail, Grey Wagtail, Bullfinch, Yellow Bunting, Reed Bunting.

Summer or Winter Visitors and Passage Migrants: Whimbrel, Common Sandpiper, Cuckoo, House Martin, Fieldfare, Wheatear, Nightingale, Sedge Warbler, Blackcap, Garden Warbler, Whitethroat, Spotted Flycatcher, White Wagtail.

AUTUMN MIGRATION, STEEP HOLM, 1962

By P. J. Chadwick

In addition to field studies on breeding gulls and resident passerines, carried out on Steep Holm, the Research Station there has been occupied for up to fifteen days in September–October in each of the past three years. The main object has been to record, trap and ring some of the many diurnal migrants visiting and passing the island at that season, and the following is a summary of the 1962 observations.

September 16 : A marked passage of Swallows was in progress on arrival and it was estimated that at least 750 crossed the Channel from Wales via Flat Holm and Steep Holm. With them were about 25 House Martins and 15 Sand Martins, while other migrants noted were a Kestrel, a Mistle Thrush and a Yellow Wagtail. Birds on the island included two Wheatears, a Whitethroat and a Goldcrest, and in the late afternoon a Turnstone settled on a scree near the summit.

September 22—*October* 6 : Observed migration was mostly on a South to South-East heading and the chief feature was again an impressive movement of hirundines (517 caught and ringed). Owing to an insufficient number of observers it was not possible to maintain a continuous watch throughout each day; hence the figures quoted tend to understate the true size of the movements. The largest discrepancy probably occurs in the total of Swallows and it seems likely that this was nearer 15,000 than the 10,000 recorded. The peak movement took place in a period of warm weather, with little or no wind, from Sept. 22–25 but good counts were also made on 28th to 30th, with moderate to strong winds varying between West and South-East, and again on Oct. 2 when there were force 4–5 South-West to West winds. House Martins (1,050 seen) were much more in evidence than in the autumns of 1960 and 1961 though Sand Martins were relatively scarce.

Kestrels were recorded on nine days, with a maximum of four on Sept. 22 when a female Sparrowhawk also flew over, heading E.S.E. Two days later a Buzzard settled for a short while before moving off across Bridgwater Bay. Peregrines (now only infrequent visitors) were seen—one on 24th and one on 25th.

Skylarks were noted on all days except Sept. 30 but were in small numbers apart from the 24th when 100 passed over. Approximately 2,000 Meadow Pipits were recorded, the majority being counted in three short periods—*c*.500, Sept. 23 – 24; *c*.450, Sept. 27 – 29; and *c*.700, Oct. 2 – 3. There was also a daily movement of *alba* Wagtails (except Sept. 30) with 230 being seen, one half passing in the period Sept. 23 – 25. Grey Wagtails appeared on nine days but only in small numbers. Of a total of 1,210 Starlings, nearly half passed on Sept. 23 and 24th.

Apart from two days in September when Linnets were observed in fair numbers (85 on 24th and 170 on 29th), the movement of finches did not really begin until Oct. 2 when 290 Greenfinches, 39 Goldfinches and 420 Linnets crossed the Channel. Greenfinches were more numerous on the 3rd but counts showed a marked reduction on the three following days while the number of Linnets declined from 170 on the 3rd to 50 on the 6th. Contrary to expectations, Chaffinches were infrequently noted and the total for the entire period was only 104. A Chaffinch trapped proved to be a bird which had been ringed on the island on the same date in 1961. Two House Sparrows were seen, Oct. 2, and the next day there was a marked easterly passage lasting an hour from 0800 hours G.M.T. In all 143 were counted, some settling on the island, as did some of 54 recorded on the 4th.

Other observations included those of a Golden Plover, Oct. 3 and 4, and a Curlew on Sept. 25 and 26, while Oystercatchers were present on most days—with a maximum of six on Sept. 6 and Oct. 5. A Stock Dove was present, Sept. 30 to Oct. 5, and a Turtle Dove made a short stay on Sept. 27. Very small parties of Carrion Crows and Jackdaws appeared, Sept. 29 (the latter departing northwards towards Flat Holm) and a party of Jackdaws on Oct. 4 passed the island heading south.

Wheatears (up to three) were present from Sept. 24 – 29, a Whinchat arrived on the 24th and single Redstarts were trapped on the 24th and 25th. A small movement of Robins occurred, and Chiffchaffs were also moving through (29 trapped), as also were a few Goldcrests.

Among less frequent visitors were a Spotted Flycatcher, Sept. 26; a Whitethroat on 27th and 28th; a Blackcap and a Garden Warbler (both mist-netted), Oct. 3; and two Pied Flycatchers (netted on the 4th). Single Tree Pipits were identified among the many Meadow Pipits passing on Sept. 24 and 28th. Two species not previously recorded for Steep Holm were Lesser Whitethroat (one, Sept. 25) and Lesser Redpoll (three or four arrived, Sept. 30).

LEPIDOPTERA NOTES
BRISTOL DISTRICT, 1962

MOTHS

By C. S. H. Blathwayt

A VERY cold and dry Spring was followed by a poor Summer with little warm weather. The best month was probably October but the year was not a good one for moths. The following notes are taken from records supplied by J. F. Burton (J.F.B.) and K. H. Poole (K.H.P.) and also from my own records (no initials).

Tethea ocularis Linn. (*octogesima* Hübn.) (Figure of Eighty). One at light at Weston, July 8.

Arctia villica Linn. (Cream Spot Tiger). A few at light at Weston in early June and as late as July 17 at Pill (J.F.B.).

Colocasia coryli Linn. (Nut-tree Tuffet). One at light at Wraxall, May 20 (J.F.B.).

Graphiphora augur Fabr. (Double Dart). Two at light at Weston, July 15 and 23.

Amathes glareosa Esp. (Autumnal Rustic). One at light at Weston, Sept. 15.

Heliophobus albicolon Hübn. (White Colon). One at light at Weston, July 8.

Procus literosa Haw. (Rosy Minor). One at light at Milton, Aug. 8 (K.H.P.).

Apamea sublustris Esp. (Reddish Light Arches). One at light at Weston, July 8

Leucania vitellina Hübn. (Delicate Wainscot). Two at light at Weston in early October.

Caradrina ambigua Fabr. (Vine's Wainscot). One at light at Weston, Sept. 26.

Laphygma exigua Hübn. (Small Mottled Willow). Two at light at Weston, Sept. 14 and 15.

Tiliacea citrago Linn. (Orange Sallow). Several at light at Weston in September.

Sterrha trigeminata Haw. (Treble-spot Wave). Several at light at Weston, June and early July.

Discoloxia blomeri Curt. (Blomer's Rivulet). Several at light at Weston, June and July ; one at Milton, July 27 (K.H.P.).

Plemyria bicolorata Hübn. (Blue-bordered Carpet). One at light at Milton, July 23 (K.H.P.).

Nyctosia obstipata Fabr. (*fluviata* Hübn.) (Narrow-barred Carpet). One at light at Milton, July 14 (K.H.P.).

BUTTERFLIES

By J. F. Burton

IN view of the continuing scarcity of several species of butterflies, including some normally common ones, it has been decided to publish all records received for all species. In this way it may be possible to obtain a better notion of the present fortunes of the butterflies of our district during this critical period. The reasons for the decline are still not clear and several factors may be responsible, so it is especially important to collect all possible information. A study of a population of Speckled Woods in Surrey (M. J. Goddard, 1962, *Entomologist*, **95**, pp. 289–307) suggested that in 1962 the second part of the second brood failed to appear and was apparently overwintering. It would be interesting to know if the Spring brood of this species was unusually common in our district this year. All records of Speckled Wood are therefore particularly welcome.

All records of butterflies received for 1962 are given. Contributors were Messrs. R. Angles (R.A.), C. S. H. Blathwayt (C.S.H.B.), J. F. Burton (J.F.B.) and I. R. P. Heslop (I.R.P.H.).

G. refers to Gloucestershire, **S.** to Somerset.

Pieris brassicae Linn. (Large White).

S. Not common this year in north-west of the county (J.F.B.).

P. rapae Linn. (Small White).

S. Spring and Summer broods both very common in north-west of the county (J.F.B.).

P. napi Linn. (Green-veined White).

S. Rather few this year in north-west of the county (J.F.B.).

Anthocharis cardamines Linn. (Orange-tip).

S. Only a few noted this Spring in N.W. Somerset (J.F.B.).

Colias hyale Linn. (Pale Clouded Yellow).

S. Watchfield: one male, Aug. 31; Bawdrip: two males near King's Sedgemoor Drain, Aug. 31 (I.R.P.H.).

Gonepteryx rhamni Linn. (Brimstone).

G. Filton Golf Course: two on April 4, one on April 11, one on April 25 (R.A.).
S. First noted April 22, Ashton Park. Not so plentiful as in 1961 (J.F.B.). Two in Cheddar Gorge, April 28 (R.A.).

Argynnis aglaia Linn. (Dark-green Fritillary).

S. Brean Down: three at least on July 7, one on Aug. 6 (R.A.).

Euphydryas aurinia Rott. (Marsh Fritillary).

S. Fairly plentiful in its locality near Glastonbury, but much later and not as common as usual (C.S.H.B.).

Polygonia c-album Linn. (Comma).

G. Filton Golf Course: 2 at catkins, April 13; one, Aug. 1 (R.A.).
S. Chew Valley Lake: one, Aug. 4 (R.A.). Sand Point: one on brambles, Oct. 14 (R.A.).

Aglais urticae Linn. (Small Tortoiseshell).

G. Filton Golf Course: frequent on following dates: Mar. 27, April 28, Oct. 13, Oct. 29 (R.A.).
S. Noted in small numbers throughout N.W. Somerset in April, June, July and August (J.F.B.).

Vanessa cardui Linn. (Painted Lady).

S. Sand Point: one, Sept. 2; Brean Down: one, Sept 9; Chew Valley Lake: one, Sept. 8(R.A.). A few seen near Weston-super-Mare from the end of June until October, becoming fairly plentiful in early October (C.S.H.B.).

V. atalanta Linn. (Red Admiral).

S. Sand Point: one or two flying east, Oct. 7; one seen Sept. 16 (R.A.).

Melanargia galathea Linn. (Marbled White).

S. Fairly common in its haunts around Weston and also near Glastonbury, but much later than usual (C.S.H.B.). Chew Valley Lake: about 6 rather worn individuals on grassy bank, July 15 (J.F.B.); Brean Down: one, July 8; Worlebury: one, July 6 (R.A.).

Pararge aegeria Linn. (Speckled Wood).

G. Filton: noted, June 27 (R.A.).
S. Scarcer than usual in N.W. Somerset. First seen April 28, at Pill (J.F.B.). Sand Point: two, April 29 (R.A.).

P. megera Linn. (Wall Brown).

G. Filton: one each on Aug. 22 and 27 (R.A.).
S. Sand Point: one, June 24 (R.A.).

Eumenis semele Linn. (Grayling).

S. Brean Down: several, June 30; many, July 7 (R.A.).

Maniola jurtina Linn. (Meadow Brown).

S. Fairly common throughout N.W. Somerset in 1962 (J.F.B.).

Aphantopus hyperanthus Linn. (Ringlet).

S. Leigh Woods: several, July 15 (J.F.B.).

Coenonympha pamphilus Linn. (Small Heath).

G. Filton Golf Course: three, Aug. 22 (R.A.).
S. Rather scarce in 1962 in N.W. Somerset (J.F.B.).

Polyommatus icarus Rott. (Common Blue).

S. Pill: fairly plentiful in August; Barrow Gurney Reservoir: frequent (J.F.B.).

Lysandra coridon Pod. (Chalkhill Blue).

S. Fairly plentiful in its restricted localities near Weston and Glastonbury from late July until September. This species appeared to have had its best season since 1958 (C.S.H.B.).

L. bellargus Rott. (Adonis Blue).

G. Filton Gold Course: one only, June 28 (R.A.).

Thymelicus sylvestris Pod. (Small Skipper).

S. Fairly common at Pill, Leigh Woods, Portishead and Chew Valley Lake (J.F.B.).

Ochlodes venata Br. & Grey (Large Skipper).

G. Filton: one, June 19 (R.A.).
S. Locally common in N.W. Somerset (J.F.B.).

CENTENARY CELEBRATIONS

THE Centenary year of the Society was heralded by the publication of a special part of the PROCEEDINGS, entitled *The First Hundred Years,* in which is outlined the history of the Society and details are given of its achievements in the field of natural history.

At the invitation of Council, a record is made here of the events of the Centenary year, the chief of which were the dinner and exhibition.

CENTENARY DINNER, TUESDAY, 8th MAY, 1962

Almost two hundred members of the Society and twenty-nine guests dined at the Berkeley, Berkeley Square. The Guests of Honour were Mr. Peter Scott, C.B.E., D.S.C., M.A., and Mrs. Scott. Amongst other guests of the Society were:—Alderman Marcus Hartnell, Sheriff of Bristol, and Mrs. Hartnell; Alderman and Mrs. Hugh Jenkins; Professor W. F. Whittard, D.Sc., F.R.S., and Mrs. Whittard (representing the University of Bristol on behalf of Sir Philip Morris, who was unable to be present owing to illness, and Lady Morris); Dr. Bruce Campbell, M.B.O.U. (also representing the Royal Society for the Protection of Birds) and Mrs. Campbell; Mr. John H. Barrett, M.A., Field Studies Council, Warden of Dale Fort Field Centre; Dr. E. B. Worthington, Deputy Director-General, The Nature Conservancy; Professor James Brough, President, Cardiff Naturalists' Society; Mr. C. A. Ralegh Radford, F.S.A., President, Somerset Archaeological and Natural History Society; Lieut. Col. Charles Floyd (Sheriff of Wiltshire), Wiltshire Archaeological and Natural History Society; Mr. Bernard Storer, B.Sc., The Mid-Somerset Naturalist Society; Miss Elizabeth Ralph, M.A., F.S.A., Bristol and Gloucestershire Archaeological Society; Mr. F. R. Sterne and Miss G. Robinson, Bath Natural History Society; Mr. Alan Warhurst, B.A., F.S.A., F.M.A., Director of Bristol City Museum, and Mrs. Warhurst; Dr. F. S. Wallis, formerly Director of the Bristol City Museum and a past President of the Society; Mr. R. W. M. Melvin, C.B.E., Director and General Manager of Bristol Waterworks Company, and Mrs. Melvin; Mr. H. G. Hurrell, M.A., J.P.; Mr. and Mrs. Stanley Roberts; Mr. Hugh Boyd (Wildfowl Trust); Mr. Jeremy Brien (*Evening Post*). Messages of regret for inability to be present were received from Lord and Lady Sinclair of Cleeve; Mr. E. M. Nicholson, C.B., Director-General of the Nature Conservancy; Mr. P. E. Brown, Royal Society for the Protection of Birds; Mr.

R. E. Greed and Mr. J. S. Young, Bristol Zoological Gardens; Dr. K. B. Rooke, Dorset Natural History and Archaeological Society; Mr. and Mrs. E. J. Mason; Mrs. H. G. Hurrell; the Cotteswold Naturalists' Field Club. Telegrams and messages of congratulations were received from the Norfolk and Norwich Naturalists' Society, the Field Studies Council, the President and Council of the Royal Society for the Protection of Birds, the Mid-Somerset Naturalist Society, the Bristol and District Branch of the Pharmaceutical Society of Great Britain (of which the distinguished botanist J. W. White was once a member), and Guy Mountfort, formerly Secretary of the British Ornithologists' Union.

After an excellent dinner the Loyal Toast was honoured, and Mr. Peter Scott, introduced by the President, rose to propose the toast of the Society. It was a matter for congratulation that it had established and maintained a position in the forefront of Natural History studies in Bristol, and he expressed the hope that it would continue to bring together the amateur naturalist and the scientific specialist. Speaking of the work of the Wildfowl Trust at Slimbridge he described his exciting experience on the banks of the Severn sixteen years ago when, in company with our Centenary President, he saw two Lesser White-fronted Geese—only the third and fourth to be recorded for the British Isles.

Mr. H. H. Davis, in his reply, stressed the great importance of the work at Slimbridge and the advantages to the Society that the world's greatest centre of wildfowl preservation and research was located so close to Bristol.

The toast of the Guests was proposed by Miss M. H. Rogers, Centenary Vice-President, in a clever and amusing speech in which she described some of her experiences in teaching biology. Speeches in reply were made by Alderman Marcus Hartnell (Sheriff of Bristol) and Dr. Bruce Campbell.

In the B.B.C. programme *Round-up* on the evening of the dinner, Dr. F. Coles Phillips was interviewed and gave details of the Society's activities and of its achievements in the past.

CENTENARY EXHIBITION, 4th—30th JUNE, 1962

The Exhibition was held in the City Museum, Queen's Road, by kind permission of the Director, Mr. Alan Warhurst. It was originally planned to be on view from 4th to 16th June, but so much interest was aroused that it was extended to the end of the month. In declaring the Exhibition open, Dr. Bruce Campbell referred to the value of the work by local naturalists' societies in helping to keep a close watch on threats to wild life in Britain inherent in many modern developments.

Each of the four specialised Sections of the Society contributed an exhibit. The Geological Section showed a series of early geological maps of the district to illustrate the work of William Sanders, and a selection from the J. W. Tutcher collection of ammonites. Recent work by members of the Section was illustrated by a selection of fossils from the quarries on Dundry Hill re-excavated by Messrs. T. R. Fry, F. S. Ross and others; specimens of Cotham Marble exhibited by Mr. W. F. Vernon (who is collaborating with Mr. D. Hamilton, B.A., M.Sc., in research on the Rhaetic); fauna from the Carboniferous Limestone of the Mendips exhibited by Mr. C. B. Salter; and petrological work on stone axes by Dr. F. S. Wallis and Mr. E. D. Evens. Other exhibits included a selection of minerals from the Trelease collection shown by Mrs. G. S. Wakefield and Coal Measure plants collected by Dr. A. Marsden.

A map of the Bristol district, together with photographic studies of typical habitats and various breeding species, formed the centre piece of the exhibit by the Ornithological Section. Maps and charts relating to present field-work by the Section illustrated a Census of Rookeries in South Gloucestershire; a study on the population of Shelducks on the coastline of the area and continuing work on the gull colony on Steep Holm. Studies of migration were illustrated by maps of the British Isles and Europe showing recoveries of birds ringed by members of the Section, and by the Wildfowl Trust.

The Botanical Section illustrated the flora of limestone areas near Bristol by means of an exhibit of live plants collected by Mr. I. W. Evans and Mr. and Mrs. C. H. Cummins. Mr. Evans showed also a collection of alien plants, now common in the district, which were rare or unknown a century ago; accompanying notes by Dr. A. F. Devonshire gave the country of origin and the dates of first record in Britain and in the Bristol district. Other exhibits included a collection of Mycetozoa, with a distribution map and details of structure and life history, shown by Mr. F. W. Evens; a collection of pressed specimens of alien grasses shown by Mr. I. W. Evans; and live plants from the Nailsea district collected by Mrs. D. E. Bunce.

The basis of the exhibit by the Entomological Section was a selection from the extensive collections, preserved in the City Museum, of Messrs. C. J. Watkins, H. J. Charbonnier, J. W. Norgrove, C. Bartlett, S. Barton, and C. W. Braikenridge, deceased former members of the Section. Mr. J. Eatough showed some attractive enlargements of photographs of British Insects and Spiders.

On sale for the first time at the Exhibition were lapel badges, specially designed for the Society, showing the Flower of Bristol, *Lychnis chalcedonica.*

RECEPTION BY THE LORD MAYOR, 8th JUNE, 1962

The South-Western Naturalists' Union was invited by the Society to hold their thirty-fifth Annual Conference in Bristol in 1962, as part of the Society's centenary celebrations. On 8th June, the opening day of the Conference, about 150 members of the Society, with other members of the Conference, attended a Reception at the Council House, College Green. Members were received by the Lord Mayor and Lady Mayoress in the Conference Hall and excellent hospitality was provided. An address of congratulation and welcome by the Lord Mayor was replied to by Mr. O. Buckle, President of the South-Western Naturalists' Union and Mr. H. H. Davis on behalf of the Society. The Reception was concluded with a conducted tour of the Council Chamber and other important parts of the building.

CENTENARY WALK, 11th JULY, 1962

The first excursion of the Society, on 8th July, 1862, left Bristol for Bath by train, and was led by Charles Moore over Hampton Down to Claverton and along the Kennet and Avon Canal. Under the leadership of Mr. F. R. Sterne members were invited to celebrate this excursion by a centenary walk over much of the same ground as their predecessors covered one hundred years ago. A party from Bristol was met at Bathampton station by Mr. Sterne, who distributed an interesting commemorative pamphlet which he had prepared for the occasion. Though much has changed the objects of the Society have not, "so let us take this walk" writes Mr. Sterne "in the spirit in which this walk was taken a hundred years ago"—a spirit so clearly indicated in the report of that first walk—". . . omitting no object of interest likely to attract the attention of a student of nature or to call forth discussion". In spite of heavy rain during the later part of the evening, the walk was greatly enjoyed by about 40 of our members.

Special thanks are due to Mr. D. W. B. Frost, the Publicity Secretary of the Society, for assembling press cuttings, photographs and information regarding the Centenary activities. The file so prepared, on which the above account is based, is housed with the archives of the Society in the Library.

F. Coles Phillips
A. J. Willis

PLANT COMMUNITIES ON SHAPWICK HEATH, SOMERSET

By J. F. Hope-Simpson, Sarah E. Newton and M. J. Ricketts
(Department of Botany, University of Bristol)

CONTENTS

PAGE
I. Introduction 343
II. Succession and the Classification of Communities 345
III. Description of Communities 349
  1. Oakwood
  2. Tall carr
  3. Low carr
  4. Heathy bog
  5. Rush swamp
  6. Reed bed
  7. Remnant ditches
  8. Blocked ditches
  9. Open ditches
  10. Droves
IV. General Species List 355
V. Habitat Notes on Sphagna 357
VI. Ecological Factors 358
  1. Colonisation of cuttings
  2. Water conditions
  3. pH
VII. Summary and Conclusions 360
VIII. Acknowledgments 360
IX. References 361

I. INTRODUCTION

SHAPWICK Heath, about 4 miles west of Glastonbury, is part of the peat moor between the Polden and Wedmore hill ridges. The area studied, whose southern margin almost meets the gentle slope of the Poldens, covers $\frac{3}{4}$ sq. mile (Fig. 1, p. 346). Apart from a few grazed fields at the western edge and the two eastern corners, it has not become farmland and bears a rather rich wild flora; but it has long been powerfully influenced by peat-cutting, formerly in a number of separate holdings and now by the Eclipse Peat Company.

The so-called "Heath" is not a heath and has never been one. In prehistoric times it was a raised bog, or part of a complex of raised bogs with intervening belts of sedge fen (Clapham and Godwin, 1948). For the last two millennia, however, there has been no regeneration in the manner of an active raised bog. Moreover the destruction wrought by intensive peat-cutting has resulted in a modern condition which can scarcely even be called "derelict raised bog". There has been extensive establishment, alongside some bog-like vegetation, of plants more nearly representative of fen, evidently brought about by base-rich water from the surrounding country gaining regular access to the artificial depressions. Only two small areas at the peat margin, Withy Bed Copse and another (Site Q) at the western corner of the former Decoy Pool Wood, are at or near the natural level; the rest of the Heath is about 4 ft. lower, or more in recent cuttings. During intervals between successive cuttings on the same area, new peat is formed to some extent in the waterlogged depressions.

The general nature of the peat land near Shapwick has been described concisely by Godwin (1941). The brief account by Hope-Simpson & Willis (1955) of vegetation on the Somerset peat moors refers largely to Shapwick Heath. The well-known pioneer study by Moss (1907) gives a full description of semi-natural vegetation on the Somerset levels, and from his account it is easy to tell that the condition and flora of the Heath, though still matching his description closely in some respects, have undergone much change in the past half-century—for the worse, floristically, especially in the loss of the more exclusive bog species. Moss's paper does not, however, specify that all his records are taken from Shapwick Heath itself, so that they cannot be used here for exact floristic comparison.

The area has long been familiar to naturalists as a source of botanical records; more scientifically it has acquired, through the work of Godwin and others, a classic status in the study of vegetational history in relation to archaeology. These interests have remained somewhat unconnected, in spite of the link that exists in the ecology of some of the characteristic plants. The purpose of this paper is mainly to add to the basis of facts by describing the present situation. We know something of the condition about 1900 from the observations of Moss, and of the 1936–7 condition from those of Prof. Godwin, who has added the description quoted below (p. 345). A report of the 1960 condition is appropriate not only because of the further lapse of time, but also because Shapwick Heath has just become a National Nature Reserve, of which an initial description is desirable even though future peat-cutting is likely to cause drastic changes.

Our study has been confined to the reserve. Most attention has been given to the western half, where the Roughet, extending to the railway, contains a good range of vegetation not disturbed recently. The pastured areas are not considered. The field work was mostly done in late June and early September, 1960.

The names used for vascular plants are taken from Clapham, Tutin & Warburg (1957). For mosses the names follow Richards & Wallace (1950).

II. SUCCESSION AND THE CLASSIFICATION OF COMMUNITIES

No part of Shapwick Heath bears vegetation that one can suppose would have been the same in man's absence. Except on two small areas mentioned already, the whole original surface has been cut away. Consequently the re-established vegetation consists of stages in "turbary subseres", that is, in secondary successions on sites created in the exploitation of peat.

With regard to the surviving fragments of the natural surface, their preservation is desirable because they provide the only remaining ground for possible renewed studies of the more recent peat and, in addition, Withy Bed Copse probably preserves a length of ancient trackway (Foster's Track; Godwin, 1960 and *in litt.*). Their existing vegetation, reported later (p. 351), does not show many features of obvious interest and may well have been altered and impoverished within recent years by the reduction of the sites to areas of very small extent. At Site Q this contraction has taken place within the last 25 years. In 1936–37, Prof. Godwin was in time to see, adjoining Site Q, an adequately large area of the primary bog surface and its vegetation. He has very kindly given us (*in litt.*) the following description amplifying the brief one in his paper of 1941. It portrays a condition now extinct and much more natural than any existing at present; it was not really natural, since peat-cutting and artificial drainage had long been affecting the hydrology of the whole Heath.

> "To the south of Decoy Pool Drove, and extending from the batch of Burtle sand at the western end [part of Site Q; see p. 351] some two or three hundred yards eastwards, there was an old woodland area apparently on an undisturbed bog surface and bearing quite large oaks and pines. As I recollect, the oaks were 40 or 50 feet high and of pioneer form. The trees were not dense, however, and there was a tremendously thick undergrowth of sallow, sweet gale, *Rubus* and bracken . . . . Bracken was extremely abundant, locally at least, because the rhizomes were present whenever we tried to get peat samples for analysis through the uppermost flooding horizon in that part of the Heath . . . . The Decoy Pool itself existed within a woodland of the kind I have described.
>
> Of course, it has now become clear that the bog surface at this point was of late Roman age, and I simply do not know what intervened between 400 A.D. when it was still a bog and 1935 when I saw it. We never saw any evidence that peat had been cut from the smooth rounded surface as it then was, but in some places to the east there were old field drains (clay pipes) just below the surface,

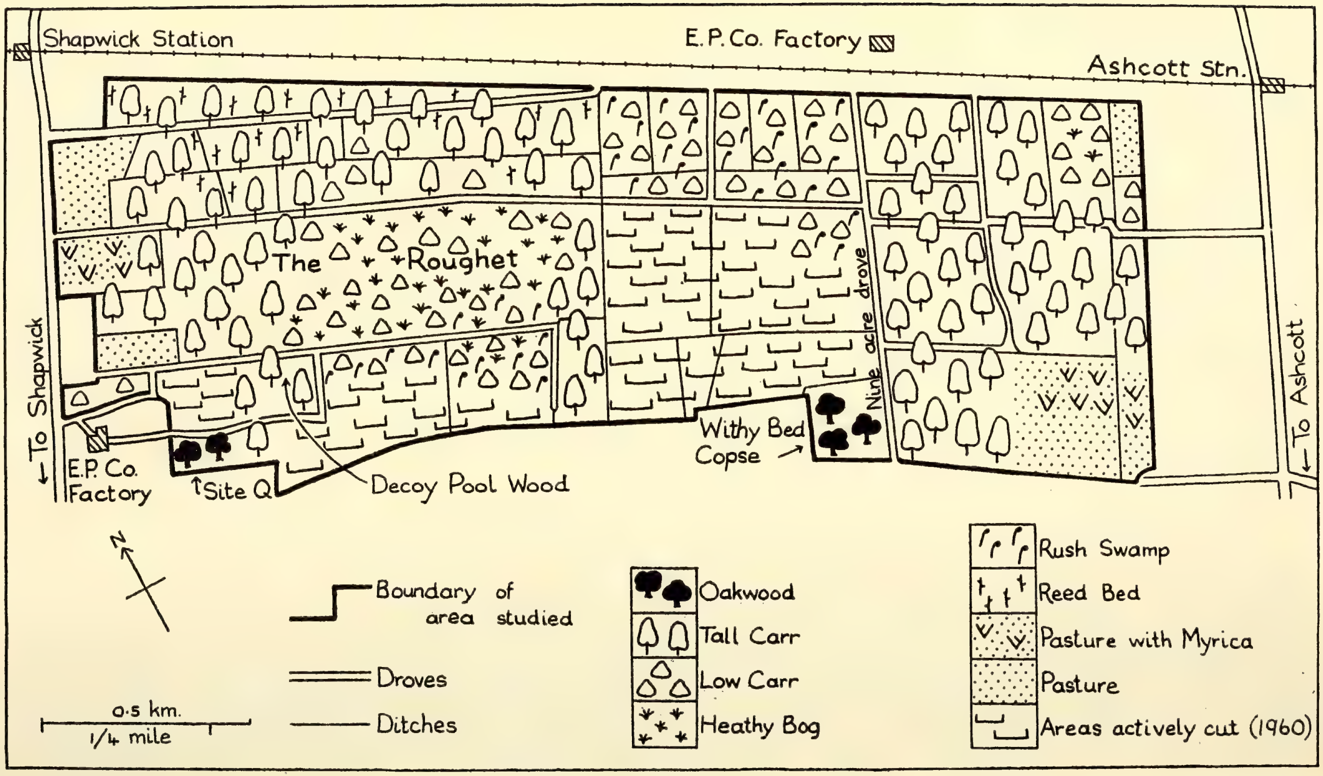

Shapwick Station
E.P.Co. Factory ▨
Ashcott Stn.
The Roughet
Nine acre drove
Withy Bed Copse
Decoy Pool Wood
Site Q
E.P.Co. Factory
To Shapwick
To Ashcott
N
0·5 km.
1/4 mile
Boundary of area studied
Droves
Ditches
Oakwood
Tall Carr
Low Carr
Heathy Bog
Rush Swamp
Reed Bed
Pasture with Myrica
Pasture
Areas actively cut (1960)

FIG. 1. *Shapwick Heath: Plant Communities, 1960*

Where the community symbols are intermixed, either the communities themselves are closely intermixed (notably low carr with rush swamp; see text, p. 352) or they show gradations. Only a few of the numerous ditches are shown.

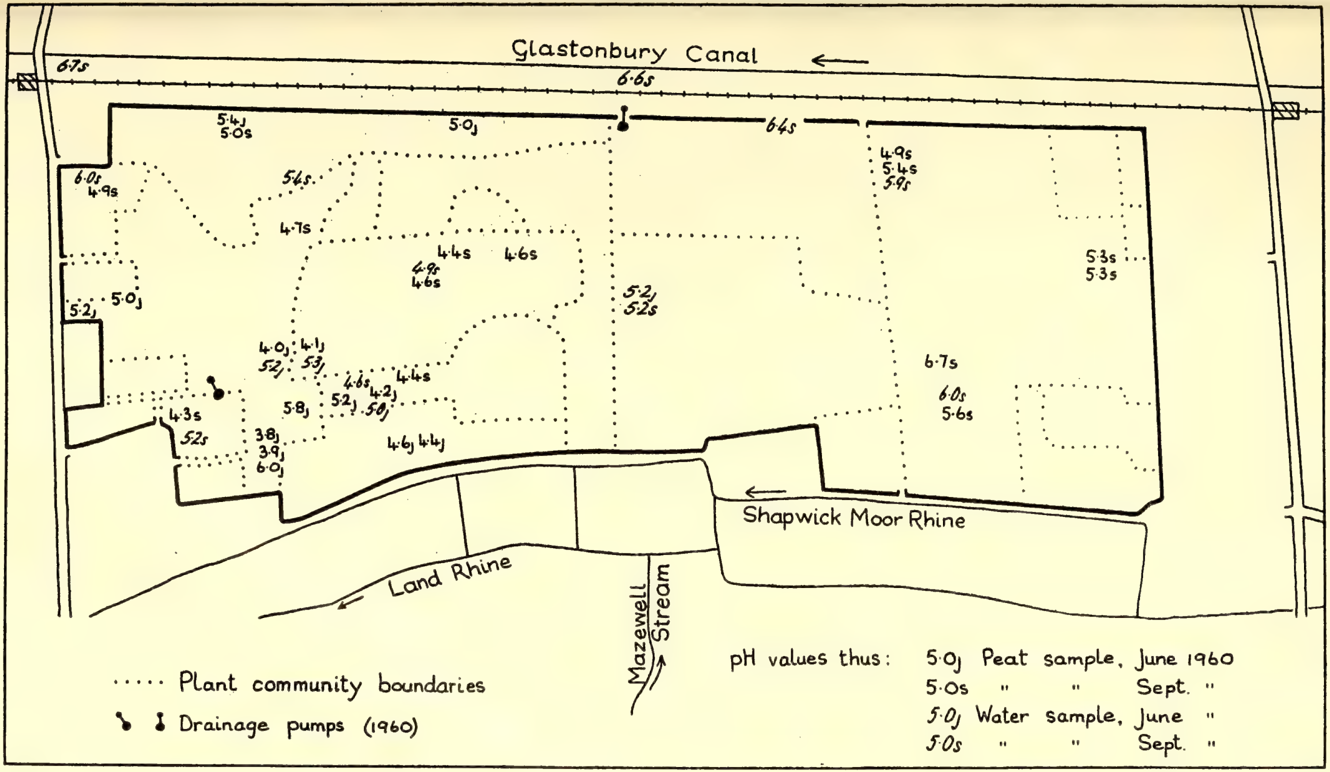

Glastonbury Canal
6·7s
6·6s
6·4s
5·4j
5·0s
5·0j
6·0s
4·9s
5·4s
4·7s
4·4s
4·6s
4·9s
4·6s
5·2j
5·2s
4·9s
5·4s
5·9s
5·3s
5·3s
5·2j
5·0j
4·0j
4·1j
5·2j
5·3j
4·6s
4·2j
4·4s
5·8j
5·2j
5·0j
4·3s
5·2s
3·8j
3·9j
6·0j
4·6j
4·4j
6·7s
6·0s
5·6s
Shapwick Moor Rhine
Land Rhine
Mazewell Stream
Plant community boundaries
Drainage pumps (1960)
pH values thus:
5·0j Peat sample, June 1960
5·0s " " Sept. "
5·0j Water sample, June "
5·0s " " Sept. "

FIG. 2. *Shapwick Heath: External Watercourses; pH Values*

The canal and rhines named connect with the drains on the Heath (see text, p. 359). Sites of sampling for pH are indicated approximately; the water samples came from ditches or, where shown, the Glastonbury Canal (see text, p. 359).

> so that there might well have been some local cultivation. The road to Westhay across Shapwick Heath was made fairly recently, but I suspect that peat-digging has been going on in various parts of the Levels since Mediaeval times and it may be that the growth of the big trees that I remember near Decoy Pool Drove had been induced by the big increase of activity in the 18th century and afterwards."

The plant communities on the Heath comprise a wide variety. Some of the interacting factors responsible are matters of past treatment which cannot be discovered in detail. The most obvious factor of this kind is the time lapse since a given area of peat was last cut. Besides this, the subsere after cutting is presumably affected by the variable mass of partly living turf ("fill-in") usually thrown into the worked-out depression during clearance of an adjoining strip due to be cut next.

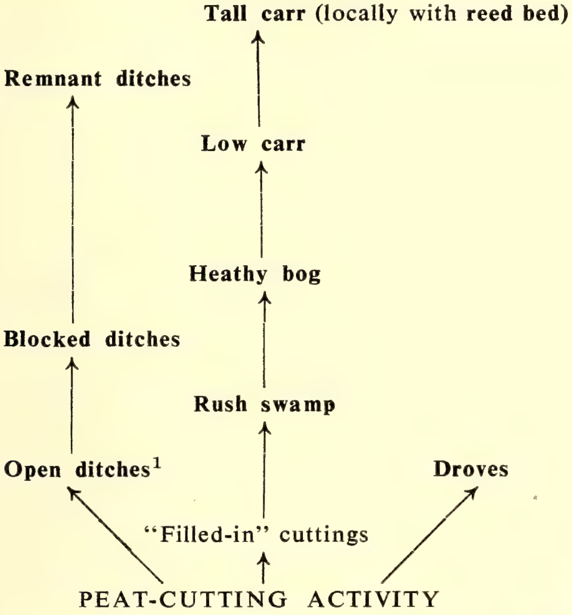
Except where the succession has been recently interrupted by peat-cutting, almost the whole area shows stages of progress to a carr of sallow (*Salix atrocinerea*) and birch (*Betula pubescens*), often with alder as well. This seems to be the vegetation climax with the prevailing degree of ground wetness, at any rate in the absence of frequent fire. Oakwood is confined to the two highest, uncut areas mentioned previously. Isolated, small colonists of *Quercus robur* occur in many cut areas, but they are never more than occasional and are small (up to 12 ft.); possibly they suffer from waterlogging when they reach a size demanding some depth of root system.

For purposes of description, the vegetation is classified into ten communities, some named from their habitats for convenience:

1. Oakwood
2. Tall carr
3. Low carr
4. Heathy bog
5. Rush swamp
6. Reed bed
7. Remnant ditches
8. Blocked ditches
9. Open ditches
10. Droves

A few communities, little studied by us, are excluded from this account. One consists of stands of *Typha latifolia* which here and there fill whole cuttings. A heterogeneous herbaceous cover occurs in much of the largest area mapped in Fig. 1 as low carr with rush swamp. *Myrica gale*, occurring in carr and heathy bog, forms some thick stands in the north-west quarter of the reserve; their extent is uncertain and they are not shown on the map. The most important excluded communities are the pastures, with or without *Myrica*. These deserve special study; the area in the south-east corner of the reserve not only has a large flora but also is interesting ecologically in that the short turf contains Sphagna, *Erica tetralix* and other plants more reminiscent of bog than grassland.

The numbered order of the communities, with the extensive woody ones placed first, on the whole reverses that of the succession and, with exceptions, proceeds from drier to wetter. The subseral relationships are mostly quite evident from intermediate states and are expressed by the following scheme. Oakwood is excluded because the two examples, standing on ground not cut for peat, are *ipso facto* not part of a turbary subsere.


Tall carr (locally with reed bed)
Remnant ditches
Low carr
Heathy bog
Blocked ditches
Rush swamp
Open ditches[1]
Droves
"Filled-in" cuttings
PEAT-CUTTING ACTIVITY

III. DESCRIPTION OF COMMUNITIES

In most of the communities the vegetation was recorded by listing the species present in stands of adequate but undefined extent and assessing abundance subjectively. Table I gives the main results.

For community 1 (oakwood) a single area only was listed.

For communities 2—8 two or more stands each were recorded. Here the symbol given in Table I represents the average abundance; it is to be emphasised that, as the entries are intended to give only the principal components of the community, they omit single-stand occurrences except a few with some particular interest.

Community 9 (open ditches) was not seriously recorded; 10 (droves) is so variable and rich in composition that its flora is merely indicated qualitatively in the general species list on p. 355–7.

[1] Provisionally we include here not only drainage ditches but also those few peat cuttings which receive no "fill-in". Whether they actually undergo the same succession as the ditches is not established.

TABLE I.

THE PRINCIPAL PLANTS OF COMMUNITIES 1 – 8

The omission of communities 9 and 10 is explained on p. 349, where the derivation of the abundance estimates is also given. Abbreviations: *d* dominant, *cd* co-dominant, *sd* subdominant, *a* abundant, *f* frequent, *o* occasional, *r* rare; as prefixes, *l* locally, *v* very. + (col. 6, reed bed) signifies presence only in parts under carr. Bryophyte names are italicised.

		Tall carr							
	Oakwood	East	West	*Low carr*	*Heathy bog*	*Rush swamp*	*Reed bed*	*Remnant ditches*	*Blocked ditches*
Community No.	1	2E	2W	3	4	5	6	7	8
Quercus robur	ld	·	·	·	·	·	·	·	·
Pteridium aquilinum	sd–d	·	·	·	·	·	·	·	·
Chamaenerion angustifolium	r	·	·	·	·	·	·	·	·
Circaea lutetiana	r	·	·	·	·	·	·	·	·
Galium aparine	r	·	·	·	·	·	·	·	·
Polystichum setiferum	r	·	·	·	·	·	·	·	·
Solanum dulcamara	r	·	·	·	·	·	·	·	·
Stellaria media	r	·	·	·	·	·	·	·	·
Urtica dioica	r	r	·	·	·	·	·	·	·
Rubus (brambles)	r	la	o	·	·	·	·	·	·
Alnus glutinosa	·	o	o	·	·	·	·	·	·
Frangula alnus	·	a	r–o	·	·	·	·	·	·
Dryopteris filix-mas	·	r	·	·	·	·	·	·	·
D. spinulosa	·	r	r	·	·	·	·	·	·
Athyrium filix-femina	·	r	vr	·	·	·	·	·	·
Rosa sp. (Sect. Caninae)	·	·	r	·	·	·	·	·	·
Betula pubescens	o	d	va	d	a	o	·	·	·
Salix atrocinerea	o–f	r–cd	d	a	o	o	·	·	·
Osmunda regalis	vr	r	o–la	f	f	·	·	·	·
Myrica gale	·	·	o–sd	o	r–o	·	r	·	·
Sphagnum 'subsecundum' (see page 358)	·	r	o	o	o	·	·	·	·
S. rubellum	·	·	r	r	r	·	·	·	·
S. papillosum	·	·	r	o	o	·	·	·	·
Thelypteris palustris	·	f	f	r	·	·	o	f	·
Molinia caerulea	·	a	a	a	cd	o	·	·	·
Erica tetralix	·	·	·	f	f	·	·	·	·
Calluna vulgaris	·	·	·	a	cd	la	·	·	·
Salix repens ssp. repens	·	·	·	r–o	r	·	r	·	·
Carex paniculata	·	a	a	f	·	o	·	o	o
Drosera rotundifolia	·	·	·	·	r–o	·	·	·	·
Eriophorum vaginatum	·	·	·	·	vr	·	·	·	·
Sphagnum recurvum	·	·	·	·	vr	·	·	·	·
S. squarrosum	·	r	o	o	o	o	·	r	lcd
Hydrocotyle vulgaris	·	o	o	·	·	a	·	a	o
Juncus effusus	·	o	a	·	o	cd	·	f	lcd
Carex nigra	·	·	·	·	·	o–lf	·	·	·
Holcus lanatus	·	·	·	·	·	o	·	·	·
Aulacomnium palustre	·	·	·	·	·	r	·	·	·
Eriophorum angustifolium	·	·	·	o	o	cd	·	·	cd
Peucedanum palustre	·	·	f	·	·	o	a	f	·
Phragmites communis	·	·	·	·	·	·	a–cd	·	·
Lysimachia vulgaris	·	·	·	·	·	·	a	·	·

TABLE I (cont.)

		Tall carr							
	Oakwood	East	West	*Low carr*	*Heathy bog*	*Rush swamp*	*Reed bed*	*Remnant ditches*	*Blocked ditches*
Community No.	1	2E	2W	3	4	5	6	7	8
Valeriana officinalis	·	·	·	·	·	·	o	·	·
Epilobium palustre	·	·	·	·	·	·	+	·	·
Juncus articulatus	·	·	·	·	·	·	+	·	·
Lycopus europaeus	·	·	·	·	·	·	+	·	·
Lythrum salicaria	·	·	·	·	·	·	+	·	·
Lotus uliginosus	·	·	·	·	·	o	+	o	·
Agrostis canina var. canina	·	·	·	·	·	a	·	·	lcd
Galium palustre	·	·	·	·	·	·	o	o	·
Rumex hydrolapathum	·	·	·	·	·	·	o	o	·
Potentilla palustris	·	·	·	·	·	·	o–a	a	·
Iris pseudacorus	·	·	·	·	·	·	r	a	·
Typha latifolia	·	·	·	·	·	·	o	a	la
Carex pseudocyperus	·	·	·	·	·	·	·	o	·
Acrocladium cuspidatum	·	·	·	·	·	·	r	·	o
Sphagnum cuspidatum	·	·	·	·	·	·	·	·	lcd
Juncus bulbosus	·	·	·	·	·	·	·	·	o
Potamogeton spp.	·	·	·	·	·	·	·	·	o
Oenanthe aquatica	·	·	·	·	·	·	·	·	r

1. Oakwood

The two small oakwoods, Withy Bed Copse and Site Q, are both on ground which must have been on or (Site Q) near the rand, or sloping flank, of the former raised bog. We have not examined Withy Bed Copse thoroughly. It is conveniently classed with Site Q which it now somewhat resembles, although the oaks are few and small and there is much more ash, planted and coppiced.

On Site Q the oaks are also sparse; there are a dozen or so, branching widely and up to 50 ft. high, but about four of them are small (10–15 ft.). Otherwise the vegetation is almost entirely bracken up to 7 ft. high; a few other species appear in small amount where the bracken is thinner. The single clump of *Osmunda* is a very large one. The species list in Table I comes from Site Q.

Although the present oakwood community has apparently developed by natural means on an undisturbed surface, it certainly cannot be considered a preserved sample of vegetation that would be more extensive if a substantial area of bog surface had been left uncut. That condition is represented by Godwin's description, quoted earlier. Close encroachment of peat-cutting may have caused accelerated drying of the remnant of raised ground (and likewise at Withy Bed Copse); besides which, the ground at Site Q is in part not dried bog at all, but Burtle sand (brought to our notice by Prof. Godwin).

2. Tall Carr

The dominant trees are birch and sallow. Their canopy varies in height (15–30 ft.) and in density; often their spacing is very close (at the closest, about 15 trees per 10 sq. yds.). Their relative quantities also vary, sometimes within a short distance. The eastern carr, where examined, has a generally high proportion of birch; *Myrica gale*, *Peucedanum palustre*, and several *Sphagnum* species are absent and *Osmunda* is rare; water levels were nearer the surface than in the western carr, and pH values were relatively high.

The ground flora is, of course, richest where the tree canopy is thin. Even here there is an appreciable area (5–10%) of bare ground, largely in remnant ditches (p. 354). The barrenness of the latter is all the more marked where they are under a dense canopy and collect a thick litter of fallen leaves.

3. Low Carr

Here the tree species are 5–10 ft. high, rather densely but variably spaced as in tall carr. Although separately recognised for descriptive purposes, low carr is merely part of the seral transition from heathy bog to tall carr. At least this is evident in the Roughet, where there has been little or no disturbance for some decades and every gradation can be seen; the record in Table I was obtained there.

The vegetation map (Fig. 1) shows low carr immediately south and east of the Roughet, intermixed with rush swamp. In these areas the mapping of 1960 has already become out of date owing to extended operations by the peat company. The low carr was not colonising the rush swamp in the cuttings, but only the intervening banks. Just south of the Roughet, the whole of this vegetation has now been destroyed. In the east central area mapped likewise, where the low carr has now been cut down, not all the cuttings contain rush swamp, and the vegetation between them is partly a heterogeneous herbaceous cover; the area is probably influenced very directly by the operation of the drainage pump beside the railway (Fig. 2).

4. Heathy Bog

This community, occurring principally in the Roughet, is closely mixed with gradations to low carr, which contains most of the same species (Table I, col. 4 cf. 3).

Straight banks are present, with relatively dry surface, bearing tall *Calluna* with birch colonists. The heathy bog itself, occupying the old cuttings, is the nearest approach to natural bog vegetation now existing on Shapwick Heath. The peat (pH 4.0–4.5) is more acid than elsewhere, apart from droves and, apparently, rush swamp. Dominance is generally shared by *Molinia* and *Calluna*, with *Erica tetralix* less plentiful. Dense or loose tussocks of *Sphagnum* spp. are frequent, often bearing various liverworts and, less often, *Drosera rotundifolia*. Low birches are widely spaced, with sallow more local. *Salix repens* is characteristic here and in the associated low carr.

The very rare occurrence of *Eriophorum vaginatum* is interesting. Its remains in the peat show that it was common on Shapwick Heath in the Sub-boreal Period and also in the Iron Age, soon after 500 B.C. (Clapham & Godwin, 1948). Although modern conditions are apparently unfavourable on Shapwick Heath, *E. vaginatum* grows plentifully on Westhay Moor, 2–3 miles away.

5. Rush Swamp

In the subsere following peat-cutting, rush swamp seems to be the earliest stage represented by many similar stands, i.e. constituting a recognisable community type. It forms a nearly closed community, although standing water is often present. The belts of rush swamp are showy expanses of white at the fruiting-time of the cotton sedge, *Eriophorum angustifolium*. Birches and sallows are few and small (to *c.* 4 ft. high). The beginning of succession to heathy bog is exemplified in Table I by the record of locally abundant *Calluna* in the rush swamp list.

6. Reed Bed

This term is used for extensive stands of *Phragmites*. They are confined to the north-west quarter of the Heath. Neither in June nor in the much wetter weather of September (1960) did water stand above ground ; it appears that the *Phragmites* has spread from colonies which originated in ditches. The reed-bed flora has a fen-like composition, as the list in Table I shows, and in this context it might be significant that *Peucedanum palustre*, though present in other communities on the Heath, has its highest abundance record here. (The interest of milk parsley as a plant of the Somerset Levels is made apparent in the *B.S.B.I. Atlas*. A comment by Hope-Simpson and Willis (1955), referring to "poorly grown" plants on Shapwick Heath, may be misleading. Many of the plants are small, but well grown ones are not uncommon.)

In a narrow sense the reed bed is not a single community, for it is partly treeless and partly under a fairly tall, open carr. In the latter situation, which is the more extensive, the *Phragmites* is sparser and a few additional species are present (+ in Table I) which mostly reinforce the fen-like distinctness of the reed-bed flora. The pH values, although somewhat acid (5.0–5.4), were in general higher than those of peat samples from elsewhere in the western half of the Heath.

7. Remnant Ditches

Former ditches which have become nearly functionless are evident in carr. Although usually waterless at the surface, their courses are about 6 in. below the surrounding ground level, and few trees grow in them. In dense carr they are covered with dead leaves and bear little plant growth, although scattered *Typha latifolia*, *Peucedanum palustre* and *Carex pseudocyperus* occur, with species of *Sphagnum* here and there along the edges. In less shaded habitats the remnant ditches contain also *Potentilla palustris*, *Thelypteris palustris*, *Iris pseudacorus*, *Hydrocotyle vulgaris* and *Rumex hydrolapathum*. In the open, for instance beside droves, there are some old ditches, normally waterless, which carry stands of *Typha latifolia*, often with large amounts of *Carex pseudocyperus*.

The species list in Table I comes from remnant ditches in sparse low carr and heathy bog.

8. Blocked Ditches

These ditches contain water covered with partly floating vegetation. The latter varies a good deal and is shown in Table I by an average list. *Sphagnum cuspidatum* and *S. squarrosum*, which form dense masses, apparently play a major part in impeding the flow of water. We do not know how long it takes for ditches to become thoroughly blocked. Those in the Roughet must have been untouched for about 30 years before our recording, but a similar condition is seen in other places where the period may have been shorter.

9. Open Ditches

These (together with abandoned cuttings in a similar stage) have had no systematic study in our work. They contain peaty water with floating plants such as *Lemna minor*, species of *Callitriche*, *Utricularia* and *Potamogeton*, *Hydrocharis morsus-ranae* (infrequent), *Hottonia palustris* (local in E. carr) and *Drepanocladus fluitans*.

10. Droves

The main droves are drained freely, by ditches alongside and usually by maintenance of the surface at a relatively high level. There is frequent traffic caused by peat-cutting activity and the disturbed surface is loose and only partly colonised by a large, miscellaneous flora containing numerous casuals and weeds. We have recorded over 100 species on the droves; they are indicated by 'D' in the general species list (below). Most are common plants, although *Radiola linoides* and *Wahlenbergia hederacea* are present, the latter usually where there is some shelter and relative freedom from disturbance. The flora is interesting because some members show unusual abundance, luxuriance or variability, due no doubt to the opportunities provided by reduced competition and the uncommon type of substratum. The freely drained peat is, however, one of the most acid habitats, judging by four samples giving pH 3.8–4.6 (a fifth gave 6.0).

IV. GENERAL SPECIES LIST

The following plants were observed within the Nature Reserve during this study. They comprise the bulk of the flora, but not the whole of it. The chief omissions are likely to be plants of the pastured areas.

'D' indicates plants found on droves, whether or not they also occur elsewhere.

Vascular Plants

D Acer pseudoplatanus
Agropyron repens
D Agrostis canina var. canina
D A. stolonifera
D A. tenuis
D Aira praecox
Alisma plantago-aquatica
D Alnus glutinosa
D Angelica sylvestris
D Anisantha sterilis
D Anthoxanthum odoratum
Apium nodiflorum
D Arctium sp.
D Arenaria serpyllifolia
D Arrhenatherum elatius
Athyrium filix-femina
Avena sativa
D Betula pubescens
D Bidens cernua
D B. tripartita
Calamagrostis epigejos
Callitriche sp.
D Calluna vulgaris
Caltha palustris
D Calystegia sepium
D Carex contigua
C. nigra
C. paniculata
C. pilulifera
C. pseudocyperus
C. riparia
C. rostrata
Centaurea nigra
D Cerastium viscosum
C. vulgatum
D Chamaenerion angustifolium
D Chenopodium album
D C. polyspermum
Circaea lutetiana
D Cirsium dissectum
D C. palustre
D C. vulgare
Conium maculatum
D Crataegus monogyna
Cynosurus cristatus
D Dactylis glomerata
D Daucus carota
Drosera rotundifolia
Dryopteris austriaca
D. filix-mas
D. spinulosa
Eleocharis spp. (incl. palustris)
Eleogiton fluitans
Epilobium hirsutum
D E. montanum
D E. obscurum
E. palustre
E. parviflorum
D E. parviflorum × obscurum
Equisetum fluviatile
Erica tetralix
Eriophorum angustifolium
E. vaginatum
D Eupatorium cannabinum
D Euphrasia brevipila
Filipendula ulmaria

D Frangula alnus
D Galeopsis tetrahit
Galium aparine
G. palustre
Glyceria declinata
G. fluitans
G. maxima
Hedera helix
D Heracleum sphondylium
Hieracium sp. (Sect. Tridentata)
D H. sp. (Sect. Umbellata)
D Holcus lanatus
D Hordeum distichon
D H. vulgare
Hottonia palustris
Hydrocharis morsus-ranae
D Hydrocotyle vulgaris
D Hypericum perforatum
D Hypochaeris radicata
Iris pseudacorus
Isolepis setacea
Juncus acutiflorus
D J. articulatus
J. bufonius
J. bulbosus
D J. effusus (incl. var. compactus)
D J. subnodulosus
D Lapsana communis
Lemna minor
L. trisulca
Ligustrum vulgare
Linum catharticum
Listera ovata
D Lonicera periclymenum
D Lotus uliginosus
D Luzula multiflora
D Lychnis flos-cuculi
D Lycopus europaeus
Lysimachia nummularia
L. vulgaris
Lythrum salicaria
D Matricaria matricarioides
D Medicago lupulina
D Melandrium album
Mentha aquatica
Molinia caerulea
D Myosotis arvensis
M. palustris
Myosoton aquaticum
Myrica gale
Oenanthe aquatica
Oe. fistulosa
Orchis praetermissa
Osmunda regalis
D Peucedanum palustre
Phalaris arundinacea
Phleum pratense
Phragmites communis
D Pinus sylvestris
Plantago lanceolata
D P. major
Platanthera bifolia
D Polygala serpyllifolia
D Polygonum aviculare agg.
D P. convolvulus
P. hydropiper
D P. lapathifolium
D P. persicaria
Polystichum setiferum
D Populus tremula
Potamogeton spp. (incl. coloratus)
D Potentilla anglica
P. anserina
D P. erecta
P. palustris
D P. reptans
D Prunella vulgaris
D Pteridium aquilinum
D Pulicaria dysenterica
D Quercus robur
D Radiola linoides
Ranunculus acris
R. flammula
D R. repens
R. sceleratus
Rhamnus cathartica
D Rhinanthus minor agg.
D Rosa sp. (Sect. Caninae)
D Rubus (brambles)
R. caesius
D Rumex acetosa
D R. acetosella agg.
R. hydrolapathum
D Sagina apetala
D S. procumbens
D Salix atrocinerea
S. repens ssp. repens
S. viminalis
D Sambucus nigra
Scrophularia aquatica
Scutellaria galericulata
D Senecio erucifolius
D S. jacobaea
D S. sylvaticus
Sium latifolium
Solanum dulcamara
D Sonchus arvensis
D S. asper
Sparganium ramosum
D Stachys palustris
S. sylvatica
Stellaria alsine
D S. graminea
D S. media
D S. neglecta
D Succisa pratensis
Symphytum officinale
Thalictrum flavum
Thelypteris palustris
D Trifolium pratense

T. repens
Typha latifolia
Urtica dioica
Utricularia sp.
D Valeriana officinalis
D Veronica arvensis
D V. officinalis
D Vicia cracca
V. hirsuta
V. sativa
Viola palustris
D V. riviniana
D Wahlenbergia hederacea

Bryophytes

Acrocladium cordifolium
A. cuspidatum
Atrichum undulatum
D Aulacomnium androgynum
A. palustre
Brachythecium rutabulum
D Bryum pseudotriquetrum
Calypogeia fissa
Chiloscyphus pallescens
Climacium dendroides
D Dicranum bonjeani
D D. scoparium
Drepanocladus fluitans
Eurhynchium praelongum
Frullania dilatata
Hypnum cupressiforme
Leucobryum glaucum
Lophocolea bidentata and/or cuspidata
Metzgeria furcata
Pleurozium schreberi
Polytrichum commune
P. gracile
D P. juniperinum
Ricciocarpus natans
Sphagnum contortum
S. cuspidatum
S. papillosum
S. recurvum
S. rubellum
S. squarrosum
S. subsecundum
Thuidium tamariscinum
Ulota bruchii and/or crispa

Some noteworthy bryophytes found by members of the British Bryological Society are reported in *Trans. Brit. bryol. Soc.* **3**, 787 (1960). *Pallavicinia lyellii* was found by C.I. and N. Y. Sandwith in 1947 (*Proc. Bristol Nat. Soc.* **27**, 207).

V. HABITAT NOTES ON SPHAGNA

The text and Table I have already given some indication of the more important Sphagna. Altogether seven species were found. The pH samples quoted were obtained near but not in *Sphagnum* tussocks.

S. contortum. See *S.* '*subsecundum*' below.

S. cuspidatum. In some blocked ditches (pH 5.0) and a strip of waterlogged "fill-in" (pH 4.3).

S. papillosum. Frequent, forming characteristic, coarse, large tussocks; found mainly in the rush swamps, heathy bog and carrs of the Roughet (pH 4.2, 4.4, 4.6). All specimens examined lack the normally characteristic hyaline-cell papillae and therefore are probably form *laeve* or *sublaeve*.

S. recurvum. A few patches, in heathy bog and ditches (pH 4.2, 5.3).

S. rubellum. In the western half of the Heath; locally frequent in heathy bog of the Roughet (pH 4.4, 4.9), local in tall carr (O.S. plot 154) and in a "fill-in" strip near Site Q (pH 4.3).

S. squarrosum. Abundant, forming broad cushions in the carrs of the Roughet (pH 4.4, 4.9) and, less frequently, in the east carr (pH 5.2, 5.6). Also frequent in heathy bog (pH 4.6), local in rush swamp (pH 4.2) and locally dense in blocked ditches. Probably the commonest bog-moss on the Heath.

S. 'subsecundum'. This designation is used for either or both of *S. subsecundum* (identified from Roughet and eastern carr) and *S. contortum* (identified from Roughet); they were not separable in the field. *S. 'subsecundum'* occurs mainly in the carrs (pH 4.6—5.2), as loose, dark green carpets. It is almost as common as *S. squarrosum.* The latter and *S. 'subsecundum'* were the only Sphagna found in the eastern carr.

VI. ECOLOGICAL FACTORS

Some of the factors which have influenced the present pattern of vegetation probably date from the past exploitation of peat and cannot now be traced. Here are given a few facts we were able to obtain, under three headings.

1. Colonisation of Cuttings

Hitherto peat has been cut by hand. When a long trench (or 'head') is cut, the topsoil with surface litter and vegetation is cleared and thrown into the adjacent, previously cut trench, as already explained. The trench receiving the "fill-in" may by then be partly filled with water—a matter clearly relevant to the course of colonisation. The broad cuttings so formed, lined with wet "fill-in", are separated at intervals, as necessary, by ditches for drainage or banks left for access.

It seems more than probable that the course and speed of the new subsere must be influenced by the circumstances in which it begins. A generalised idea of the time-scale was obtained from peat cutters well acquainted with the Heath. The Roughet is said to have been untouched for a period varying, in different parts, between 30 and 70 years before our recording. The community pattern of 1960 was not essentially different ten years earlier. It is therefore concluded that heathy bog (the youngest major community on the Roughet) is established after 20–30 years of colonisation, and medium to tall carr after about 50 years. These estimates are very rough ones, but 20–30 years for heathy bog accords tolerably well with the local report of "at least 30 years" given by Moss (1907, p. 32).

2. Water Conditions

The watercourses adjoining the Heath are shown in Fig. 2. They drain the Heath except in spells of wet weather, when their level rises. Culverts passing under the railway to the (disused) Glastonbury Canal have valves intended to prevent flooding from it to the Heath; but in any case flooding occurs from Shapwick Moor Rhine, which is partly fed by rivulets draining the slope of the Polden Hills; the Mazewell Stream is one of these. The drainage pumps marked in Fig. 2, with capacities of 12,000 and 18,000 galls. per hour, are used to lower the water level locally where peat is to be cut.

It is easy to place some of the communities in order of increasing wetness, as follows: oakwood and droves, tall carr (west), low carr and heathy bog, rush swamp, blocked and open ditches. The remainder (eastern tall carr, reed bed, remnant ditches) belong somewhere in the middle range but we cannot place them with confidence.

Holes were dug in various sites without standing water; they showed a variable rate of inflow, apparently related to the texture of the peat locally. The short-period measurements of water level obtained are not given; instructive results would emerge only from records covering several months at least, like those obtained by Willis & Jefferies (1959) on peat elsewhere in Somerset. The seasonal variation found by them in the Gordano valley would probably be much exceeded on Shapwick Heath where, Mr. J. P. Alexander tells us, a seasonal range of about 6 ft. in height is not unusual in the ditches. This effect might be expected from pumping out on the one hand and, on the other, the large catchment area for flood water.

3. pH

Determinations were made by means of a glass electrode, in a few cases nearly 48 hours after sampling but usually much sooner. All the readings were kindly taken by Mr. M. Holmes of the Eclipse Peat Company.

Fig. 2 marks most of the values, in the approximate sites of sampling. Water in the Glastonbury Canal is not far from neutral, and that in ditches on the Heath is consistently less acid than the neighbouring peat; Willis & Jefferies (1959) found a similar situation on the peat moor of the Gordano valley.

Some relationships between pH and communities are not clearly detectable in Fig. 2, where the position of pH samples and community boundaries cannot be shown precisely. Relationships which are in fact reasonably certain have been mentioned in the descriptions of the communities (eastern tall carr, heathy bog, reed bed, droves); these and other pH relations can doubtless be clarified by fuller data.

VII. SUMMARY AND CONCLUSIONS

The foregoing account describes the modern condition of Shapwick Heath, an area of old and recent peat cuttings, and its major plant communities. Their composition is summarised in Table I (p. 350–1). They are stages in secondary succession, as outlined by the scheme on p. 349. The successional changes include the decrease of surface water, one of the most important factors.

Within this framework, other factors operate. The most evident is nutrient supply, inferred from certain contrasts in the vegetation itself. The best example is given by cols. 4 (heathy bog) and 6 (reed bed) of Table I, which have few species in common; roughly it is a contrast between rudimentary bog and fen floras. An independent pointer to nutritional differences between some of the major communities is provided by the pH results, as far as they go.

Before considering the more direct study of variation in nutrients, or the many features of plant distribution that remain to be explained, it is well to recognise that only the older tall carr may have reached a stable state in balance with the existing factors. The rest of the vegetation, being seral, is partly an expression of what plants could get established under former conditions. To understand the vegetation it is therefore necessary to record and follow the conditions and developing vegetation in chosen cuttings from the time when they are abandoned. A first slant to the succession, perhaps affecting its whole course to some extent, might be caused by initial circumstances such as the nature and amount of "fill-in" and the season when it is deposited, the water régime when colonisation starts, and the sources of seed-borne colonists at that time.

These circumstances may be greatly altered by the introduction of machinery to extract the peat. Assuming that long-term successional studies will be practicable, it may fairly be asked whether an understanding of the secondary communities will be worth elaborate research. They have been interesting because of the mixture of bog and fen tendencies. The primary aim, however, need not be to elucidate the communities as such, but rather the autecology of some of the species.

VIII. ACKNOWLEDGMENTS

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OCCURRENCE OF ILLITE IN THE GULLY OOLITE OF THE AVON GORGE

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THE mineralisation was first noted in fallen blocks of Gully Oolite below the south-west wall of Vaughan's Number 3 Quarry (Vaughan, 1936), on the Somerset side of the Avon Gorge. The blocks appeared to have fallen from a heavily iron-stained group of rocks just below the junction of the Gully Oolite with the Clifton Down Mudstone.

In the blocks of oolitic limestone could be seen 'nodules' of a soft bluish-green to red-brown mineral. The largest of these was sub-cylindrical with maximum dimensions of 6 x 3 x 2 inches, but smaller nodules, irregular patches, and 'veinlets' also occurred. In one specimen, two elongate sub-spherical inclusions of oolite, each about 0·5 inch in maximum diameter, could be seen enclosed in the body of the mineral.

The material making up the nodules and other patches has a waxy lustre and subconchoidal fracture, and on one specimen a surface texture resembling slickensides was observed. Small cavities, usually filled with cubic crystals of pyrite, occur scattered through the body of the mineral. The pyrite is frequently altered to limonite and surrounded by a red-brown alteration halo within the enclosing mineral. Secondary iron-staining is common.

Examination of the bluish-green mineral by Differential Thermal Analysis and powder X-ray Diffraction showed it to be a clay of the ledikite group, probably illite.

In polished section (see Fig. 1) the relation between the clay and the oolite in which it occurs could be determined. The 'nodule' of clay is surrounded and traversed by cracks infilled with calcite. Within the nodule single ooliths only rarely occur. Small pyrite spheres and cubes are relatively abundant, frequently showing alteration haloes. Secondary staining of the blue-green clay to a reddish-brown colour results from this alteration of the pyrite. The oolite adjacent to the nodule is iron-stained, the intensity rising to a maximum close to the nodule and diminishing outwards.

From this, it may be deduced that the clay nodules are probably of primary origin, since they contain single ooliths. Shrinkage of the nodule was followed by infilling of the shrinkage-cracks by calcite. Weathering has decomposed the pyrite to release iron which has stained both the clay and the oolite. Pyrite may also have been present in the oolite.

The clay also occurs as small flattened 'veinlets' and scattered flakes in the oolite, varying in size from about 1·5 inches long down to less than 0·05 inch.

In section, the clay patches have sharply defined boundaries with the matrix of drusy mosaic calcite. Both the matrix and the clay may be cut by later veins of fibrous calcite. Silicification close to the veins occurs, and they often have closely associated ferruginous material, both in the matrix and the ooliths. Close to the veins, the ooliths are often compressed and largely destroyed. Microstylolites may also be developed.

The pyrite cubes and framboidal pyrite spheres extracted from one of the nodules were examined for micro-organisms by the writer in conjunction with Dr. J. W. Murray, using a technique developed by Love (1957; Love and Zimmerman, 1961).

The pyrite was dissolved, in a special cell mounted on the microscope stage, in dilute nitric acid. Continuous microscopic observation of the reaction with a high-power oil immersion

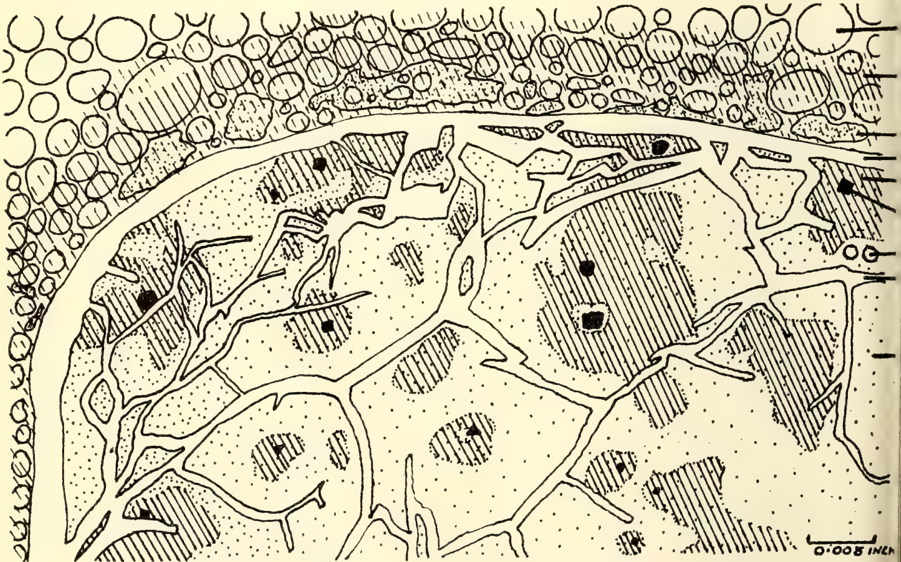

Fig. 1. Semi-diagrammatic drawing of part of a nodule in polished section. (1) Blue-green illite; (2) Pyrite; (3) Veins of fibrous calcite with some ferruginous stain (4) Secondary iron-staining of illite; (5) Calcareous ooliths, with occasional ferruginous c in a matrix of drusy mosaic calcite; (6) Iron-stained oolite adjacent to nodule.

objective revealed that the pyrite dissolved in the acid, releasing a variety of micro-organisms.

These micro-organisms, although sometimes aggregated, usually appeared as clear, rounded and featureless, single bodies about 0.5 – 2.0 μ in size, similar in appearance to the Group 5 and Group 6 cell-bodies described by Love (1962). Their origin is discussed by Love (1962), and it seems at present to be uncertain whether they originated from the breakdown of larger bodies, such as pyrite 'microberries' (Love, 1957), test-infillings, or partly developed cores of *Pyritosphaera barbaria* Love 1957.

The primary origin of the pyrite has, nevertheless, been established, since it is inferred that the pyrite was deposited in the micro-organisms, probably as an amorphous sulphide syngenetic with the deposition of the sediment, or at the time of early diagenesis before complete lithification took place (Love and Zimmerman, 1961).

It was not possible to confirm the exact location of the clay in relation to the boundary between the Gully Oolite and Clifton Down Mudstone at this locality owing to the inaccessibility of the exposure in the quarry face.

However, the contact was examined on the Portway, 22 yards south-west of the Gully Oolite Quarry on the Bristol side of the Avon Gorge. The section at the contact is shown in Table I.

TABLE I

DESCRIPTION OF BEDS	THICKNESS Inches
CLIFTON DOWN MUDSTONE	
Sharp Break	
Grey to black shale with rare single ooliths	2.4 – 5.2
Soft grey shale in which no ooliths were found	0.0 – 0.4
Purplish-grey shale with disseminated single ooliths, and small patches of bluish-green illite	0.0 – 4.0
Lenses of bright red silt with many single ooliths	0.04 – 1.6
Sharp Break	
Oolitic limestone reddened by iron-staining, intensity of staining diminishing downwards from contact	0.8 – 4.8
GULLY OOLITE	

The base of the Clifton Down Mudstone rests on an uneven surface of grey shale. The frequency with which the disseminated ooliths occur appears to increase towards the base of the shale, until they become prolific in the reddened silt at the base. These lenses of ooliths in a ferruginous matrix, which appears to be goethite, are extremely friable, and the ooliths may be brushed out with the finger. The reddening at the top of the Gully Oolite appears to be a secondary feature. The lenses of ferruginous material are deposited on a surface which, although undulatory, is not obviously ripple-marked.

The incoming of the illite into the Gully Oolite appears, from the limited evidence available, to occur close to the boundary with the Clifton Down Mudstone. The appearance of the primary illite suggests an abrupt change in sedimentation conditions with the development of iron-rich shales and silts, together with a possible reworking of ooliths. The occurrence of the pyrite in the clay nodules suggests the presence of a near-by area where biochemical formation of the pyrite could occur, and this would be a region of fine subaqueous muds "in which the change from aerobic to anaerobic conditions could occur at any depth" (Love, 1962).

Although the colouration and general appearance of the illite clay resemble some of the Old Red Sandstone sediments at Portishead, it seems unlikely that a major upheaval of the Severn Axis region occurred during C1 – C2 times of sufficient magnitude to cause erosion. Slight non-sequences in the Avonian section at Tytherington and Tidenham suggest possible elevation along the Severn Axis to near sea level; considerably more movement would be required to produce erosion of the Old Red Sandstone during the time interval represented by these beds. It is possible that these changes in sedimentation may represent a period of non-deposition prior to the deposition of the Clifton Down Mudstone.

It is hoped to extend this preliminary study elsewhere in the Bristol district.

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VOLUME XXX, PART V, 1963

CONTENTS

PAGE

Council 368
New Members and Changes of Address 369
Report of Council 372
Report of Entomological Section 372
Hon. Treasurer's Statement of Accounts 373
Report of Botanical Section 374
Report of Geological Section 375
Hon. Librarian's Report 375
Report of Ornithological Section 376
Account of the General Meetings 377
Bristol Botany in 1963, by N. Y. Sandwith 379
Bristol Bird Report, 1963 385
Lepidoptera Notes, Bristol District, 1963, by C. S. H. Blathwayt and J. F. Burton 415
A Portfolio of Devonian Coral Paintings by Spencer G. Perceval, by B. D. Webby 423
The Silurian—Old Red Sandstone Unconformity at Buckover, near Tortworth, Gloucestershire, by M. L. K. Curtis and R. Cave 427
Malachite Crystals of Unusual Habit, by C. E. Leese 443
The Triassic Dolomitic Conglomerate and Structure of the Old Red Sandstone, Portishead Coastal Section, North-East Somerset, by M. C. Pick 445
Bryophytes of Leigh Woods, Somerset, by A. J. Willis 451

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C.	Merrie, T. D. H., B.A., G.I.Mech.E.	39 Hillside Road, Cardross, Dunbartonshire
	Newman, Mrs. A. M.	Walton Lodge Preparatory School, Clevedon, Somerset
	Parsley, Miss D. I.	13 Victoria Square, Clifton, Bristol 8
	Pitman, R. A.	64 Standish Avenue, Patchway, nr. Bristol
A.	Rabbitts, B. A.	40 Sion Road, Bedminster, Bristol 3
C.	Roberts, B.	116 Nortwood Road, Tankerton, Whitstable, Kent
	Savory, Mrs. J. H.	11A Westbury Park, Bristol 6
	Smith, M. C.	10 Cornwallis Crescent, Clifton, Bristol 8
C.	Welch, Dr. F. B. A., B.Sc., Ph.D.	Penyllan, Gadshill Road, Charlton Kings, Cheltenham, Glos.
	Williams, T. R. J., M.Sc., A.R.I.C.	Tean, 39 Orchard Road, Nailsea, nr. Bristol
	Williams, Mrs. T. R. J.	Do.
	Withers, Miss D.	81 Stroud Road, Gloucester

REPORT OF COUNCIL
1963

THE membership is now 625, including 57 juniors, and there are 16 affiliated societies.

At the Annual General Meeting Dr. R. J. G. Savage was elected as President. The other Officers and Members of Council were also elected. It might have been expected that, after all the efforts put into the Centenary year, this year would prove something of an anticlimax. This, however, was not the case, the usual full and vigorous programme of lectures and expeditions being maintained. In addition the Society played its part in National Nature Week. A very successful exhibition was held in the City Museum, but perhaps the highlight was the splendidly organized and most successful Nature Trail in Leigh Woods. This attracted over 3,500 people, presumably mostly Bristolians, to the woods. A successful annual dinner was held and attended by about 100 members and guests.

We announce with regret the deaths of the following members: Miss E. H. Poplett, who acted as a most helpful assistant secretary for four years; Miss F. H. Cooke; Miss B. Wade; Mr. S. W. Richards; and Mr. H. Womersley who died on Oct. 14, 1962.

Womersley was the senior member of the Society, elected in Dec. 1919, and a well-known entomologist. He served on Council in 1921 and as President in 1922 and 1923, being made an Honorary member in 1932. During his residence of ten years in Bristol he made a close study of the Apterygota, becoming an authority on these insects, and contributing four papers on ' The Apterygota of the South-West of England ' to these PROCEEDINGS (1923–7). In 1930 he emigrated to Australia to work on insect pests under the Commonwealth Council for Scientific and Industrial Research, and later was engaged in taxonomic studies of the primitive insects and Acarina of Australia, on which groups he produced distinguished monographs.

A. C. LEACH, *Hon. Secretary.*

REPORT OF ENTOMOLOGICAL SECTION
1963

AT the 99th Annual Business Meeting held on January 15, 1963, the following officers were elected: President, Mr. K. H. Poole; Secretaries, Dr. D. A. Stopher and Miss B. E. Jones; Committee, Mr. P. F. Bird, Mr. C. S. H. Blathwayt, Mr. D. G. Gibb, Mr. N. A. Watkins and Mrs. A. Hollowell.

Following the business the Museum Collections were inspected.

During the year three indoor meetings and one field meeting were held.

Mar.	19:	Conversazione. Mr. N. A. Watkins' home.
July	6:	Shapwick Heath.
Nov.	19:	Annual Exhibition.
Dec.	10:	Films: *House Painter*, *Greenhouse White Fly*, and *Dangerous Immigrant*.

D. A. STOPHER, *Hon. Secretary.*

The Hon. Treasurer in Account with the Bristol Naturalists' Society

RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31 DECEMBER 1963

Dr.

1962 £ s. d.			£ s. d.	£ s. d.	£ s. d.
	To Members' Subscriptions:				
522 8 6	Full Members	1962	3 15 0		
		1963	492 1 11		
		1964	23 10 0	519 6 11	
55 18 9	,, ,, of the same household	1963	48 3 6		
		1964	2 10 0	50 13 6	
21 12 6	Corresponding Members	1963	16 5 0		
		1964	1 5 0	17 10 0	
10 0 0	Associates	1963	12 10 0	12 10 0	
15 10 0	Juniors	1963	11 0 0		
		1964	5 0	11 5 0	
29 0 0	Affiliated Societies	1962	2 10 0		
		1963	22 15 0		
		1964	1 5 0	26 10 0	637 15 5
654 9 9					
5 0	,, Donations				
	,, *Proceedings* (1962):				
	Grants		7 10 0		
	Separates including arrears (1961)		17 1 4		
	Subscribers		2 16 0		
62 7 8	,, Sales of Publications		13 4 0		40 11 4
					678 6 9
13 5 3	,, Sales of Badges				5 13 6
6 0 3	,, Junior Section refund				– – –
44 1 3	,, Profit and advance payment *re* film				– – –
– – –	,, National Nature Week Committee: net profit				2 18 1
– – –	,, Members' contribution to the University Appeal				65 11 6
2 17 6	,, Interest on deposit in Post Office Savings Bank				2 19 0
10 0 0	,, ,, ,, £200 5% Defence Bonds				10 0 0
793 6 8					765 8 10
468 4 6	,, Balance from last account				449 1 9
£1,261 11 2					£1,214 10 7

P. J. M. NETHERCOTT, *Hon. Treasurer,*
11 January, 1964

Cr.

1962 £ s. d.		£ s. d.	£ s. d.
74 9 2	By General Printing and Stationery	82 12 3	
93 8 6	,, Postages and telephone	85 10 9	
12 0	,, Cheque books	15 0	
12 0 0	,, Clerical assistance	12 0 0	180 18 0
180 9 8			
430 11 2	,, *Proceedings* (1962, including separates)		268 2 2
23 5 6	,, Books	8 7 0	
– – –	,, Bookbinding	20 16 0	
24 17 7	,, Periodicals	26 10 6	
1 0	,, Rent (of library room)	1 0	
3 19 2	,, Fire insurance (library)	4 10 9	60 5
	,, Subscriptions:		
2 10 0	Council for Nature, etc.	2 10 0	
3 6 0	South Western Naturalists' Union	3 5 0	
5 0 0	Steep Holm Trust	– – –	5 15 0
7 5 6	,, Fares and expenses of general meetings		13 5 0
12 19 6	,, Loss on dinner		3 3 0
4 1 10	,, Field Committee: excess expenditure		5 16 10
68 0 0	,, Grants to Sections:		
	Botanical	14 0 0	
	Entomological	10 0 0	
	Geological	15 0 0	
	Ornithological	25 0 0	64 0 0
23 6 0	,, Badges bought		– – –
22 16 6	,, Centenary expenses		– – –
812 9 5			601 5 3
	,, The University Appeal: members' and Society's donation		75 0 0
			676 5 3
	,, Balances to next account:		
83 8 6	Cash at Bank	175 9 11	
118 10 3	Deposit in Post Office Savings Bank	121 9 3	
200 0 0	£200 5% Defence Bonds	200 0 0	
47 3 0	In hands of Field Committee	41 6 2	538 5 4
£1,261 11 2			£1,214 10 7

Audited and found correct,
A. E. BILLETT, *Hon. Auditor,*
21 January, 1964

REPORT OF BOTANICAL SECTION

1963

AT the Annual Business Meeting held in the Physiology Lecture Theatre of the University on January 14, 1963, the following officers were elected: President, Mr. I. W. Evans; Secretary and Treasurer, Miss I. F. Gravestock; Committee: Mrs. D. E. Bunce, Dr. A. F. Devonshire, Mr. J. A. Eatough, Mr. H. F. Howard, Mrs. I. C. I. Milton, Mr. P. J. M. Nethercott, Miss A. M. Sampson, and Mrs. E. W. Yemm.

The Wild Plant table at the Bristol Museum has been much appreciated during the year and sincere thanks are offered to Mr. A. Warhurst and Mr. P. F. Bird of the Museum and to Mr. I. W. Evans, Mrs. G. S. Wakefield, Mrs. C. H. Cummins and all other members who contributed specimens.

During the year the following winter meetings were held:

Jan. 14: Wheat Rust Epidemics, by Mr. L. Ogilvie, M.A., followed by the Annual Business Meeting.

Feb. 11: Fungi that Attack Insects, by Dr. M. F. Madelin.

Oct. 7: Some Flowers of the Western Deserts of the U.S.A., by Mrs. E. M. Kitching.

Nov. 11: A Botanist in East Africa, by Mr. R. M. Harley, B.A.

The following field excursions took place under the leadership of those shown:

Apr. 4: The Downs. Miss A. M. Sampson. An excursion up the Gully for *Arabis stricta*, *Carex humilis* and *Hornungia petraea*.

Apr. 20: Bisley and Slad Valley. Miss D. Withers. *Helleborus foetidus* and an abundance of violets were found.

Apr. 27: Bitton to Wick. Mr. I. W. Evans. An exploration of the flora of ‘Grandmother’s Rocks’.

May 25: Chepstow and Wyndcliff. Mr. P. J. M. Nethercott.

June 19: Vine House, Henbury, and Blaise. Mr. I. W. Evans.

June 29: Old Down, Tockington. Dr. A. F. Devonshire.

July 9: Bracken Hill. Miss I. F. Gravestock.

July 27: Braunton Burrows, N. Devon. Dr. A. J. Willis. Many distinctive plants of the sand-dune system, which supports *Epipactis palustris*, *Holoschoenus vulgaris*, *Linaria arenaria* and *Teucrium scordium*, were seen.

Aug. 13: Abbots Pool. Mr. I. W. Evans.

Aug. 20: Stokeleigh Forest. Mr. G. D. Rouse, of the Forestry Commission, led the party through the various plantations in the forest.

Aug. 24: Hursley to Keynsham. Mr. I. W. Evans.

Sept. 14: Stratton Common and Cranmore. Mr. J. H. Kemp. A fungus foray with members of the British Mycological Society; about 60 species of fungi were found.

I. F. GRAVESTOCK, *Hon. Secretary.*

REPORT OF GEOLOGICAL SECTION
1963

THE Annual Business Meeting was held in the Geology Department of the University on January 16, 1964, when the following officers were elected :— President, Mr. R. Bradshaw ; Vice-President, Dr. J. W. Cowie ; Hon. Secretary, Miss M. A. Smith ; Field Secretary, Mr. A. C. K. Fear ; *Ex-officio*, Professor W. F. Whittard and the Student President of the University Geological Society ; Committee, Mr. T. R. Fry, Mr. R. G. Payne, Dr. F. C. Phillips, Dr. R. J. G. Savage, Mr. W. Stock, Mr. D. Vowles, Mr. F. S. Ross, Mr. M. D. Kamm.

During 1963 the Committee met twice, on January 10 to make proposals for officers, and on January 27 to arrange Summer and Winter programmes. The Annual General Meeting was held on January 10 when reports were read and officers elected. The President, Dr. J. W. Cowie, gave an address on " Earthquakes, Volcanoes and Mountains ".

There were four lecture meetings of the Section during 1963 :

Feb. 21 : Dr. D. E. T. Bidgood—Our Wandering Poles.

Mar. 14 : Mr. D. Ingle Smith—Limestone Solution with reference to Mendip.

Oct. 17 : Prof. M. B. Donald—The Development of the Brass Industry in England, and its relation to Calamine in the Mendips.

Nov. 21 : Mr. W. J. Larnach—Engineering Problems in Soil—the Art and Science of Soil Mechanics.

There were three field meetings during the Summer, as follows :

May 18 : Unconformities in Southern Gloucestershire ; leader Dr. J. W. Cowie.

July 13 : The Wye Valley ; leader Mr. R. Bradshaw.

Sept. 21–22 : Exeter District ; leaders Prof. Scott Simpson and Dr. E. B. Selwood.

All lectures were held in the Geology Department of the University, and once more we would like to record our thanks to Professor Whittard for making the premises freely available for these activities.

MARGARET A. SMITH, *Hon. Secretary.*

HON. LIBRARIAN'S REPORT
1963

THE total of 104 books and periodicals borrowed during 1963 by 31 members continues the decline shown over the past few years. It would appear that less and less use is being made of the library by the members of the Society.

No new exchanges were instituted during the year. At present the Proceedings of the Society are exchanged with 54 institutions in Britain and with 43 which are overseas.

R. BRADSHAW, *Hon. Librarian.*

REPORT OF ORNITHOLOGICAL SECTION
1963

'THE WREN THE WREN
THE KING OF ALL BIRDS'

At the 39th Annual Business Meeting in January, Mr. Hugh Boyd was elected President and Mr. S. M. Taylor was re-elected Hon. Secretary. Miss C. Graham and Mr. J. Boswall were elected to the Committee in place of Mrs. G. C. Buxton and Mr. J. D. R. Vernon, who retired by seniority. Mr. G. Sweet remained a Committee member as immediate Past-President.

During 1963 the Section held five indoor meetings ; a sixth had to be cancelled due to last-minute illness of the lecturer. The speakers and subjects were :

Jan. 11 : Annual Business Meeting ; Dr. E. Eastwood's films of migration study by radar, and a discussion.
Feb. 15 : Dr. C. D. T. Minton—Migration in the Wash Area.
Mar. 13 : Dr. I. C. T. Nisbet—Some Aspects of Migration in N. America.
Oct. 9 : Mr. D. Watson—The Birds of Galloway.
Dec. 11 : Dr. J. H. Crook—Weavers' Nests and their Construction.

Attendance at these meetings ranged from 46 to 85 and averaged 64.

Afternoon or evening field walks were held in the Spring to Backwell Hill, Inglestone Common, Nailsea Moor, and Saltford, led by Messrs. Taylor, Vernon, Hammacott and King respectively.

Co-operative field work during the year included a continuation of the Breeding Season censuses of Severn Vale Rookeries and of Shelduck on the coast from Bristol to Weston. Members also took part in the Ringing Scheme, Nest Record Scheme and Breeding Season Census of Common Birds organised by the British Trust for Ornithology. In this respect it is encouraging to note that our contribution of Nest Record Cards for 1962 was the fourth highest received by the Scheme in that year, and a record for the Section.

As for some years past, several members attended classes on aspects of Ornithology and related topics, run by the Extra-Mural Department of the University. We are grateful for these classes, and are concerned to make their usefulness and interest more widely known. The Committee is also considering ways of encouraging active participation in co-operative field-work.

Another development in 1963 was the inclusion of the Society's monthly bulletin of items of recent ornithological information. This has been welcomed by many members, but its continuation and possible development depend on the receipt of an adequate flow of information from members.

S. M. TAYLOR, *Hon. Secretary.*

ACCOUNT OF THE GENERAL MEETINGS
1963

THE 100th Annual General Meeting was held on Thursday, Jan. 17. The Officers and Members of Council were elected, Dr. R. J. G. Savage being elected President and Mr. F. Stenhouse Ross an Honorary member. The retiring President, Mr. H. H. Davis, gave his Presidential address on " Wild Life in Rhodesia and the Cape Provinces ". His talk on what he saw on a journey from Cape Town to Livingstone was fully illustrated with an excellent series of colour transparencies.

On Feb. 7, Mrs. Susan Cowdy of the Bardsey Island Bird Observatory lectured on " Observing migration by day and night ". She gave an account of the work of the observatory and described the lighthouse as a potential ' killer ', outlining the attempts being made to reduce the death toll of birds at such lighthouses.

On March 7, one of our members, Miss R. C. Lee, gave an illustrated account of a journey across the U.S.A. from Los Angeles to Niagara. She showed beautiful pictures of flowers as well as of scenery. The photographs were especially interesting because they showed less usual aspects of the magnificent scenery.

On Oct. 3, Mr. M. H. Woodford gave a most interesting account of " Operation Oryx " in which he took part. The oryx has become almost extinct in Arabia from being hunted with the use of motor cars. In the expedition, which was guided by natives across the desert, two males and one female oryx were caught. They were taken via Nairobi to the Arizona desert, where they were joined by two more females presented by the London Zoo and the Sheikh of Kuwait. Up to date there has been one birth.

On Nov. 7, Mr. P. C. Hutchison came from Glasgow to give an account of " Plant hunting in Anatolia ". He described, with illustrations, his journey to the Pontus Mts. and referred to the assistance given him by the Turkish Forestry Commission. Rhododendrons and lilies were especially notable in this area. The lecturer stressed that here, as elsewhere, much can usefully be done by amateurs.

On Dec. 5, Dr. L. C. Frost of the University of Bristol lectured on Nature Conservation with which he is closely connected. The aim is to prevent destruction of plant and animal communities both rare and useful, and those of scientific importance. He spoke about the County Trusts and the valuable work that they are doing. He said that our Society could help by giving moral and practical support, and the members by joining a Trust. He illustrated plants in the Avon Gorge that are in need of conservation.

A. CROOME LEACH, *Hon. Secretary.*

GENERAL FIELD MEETINGS

EIGHTEEN field meetings were held during the year and generally proved popular. The Social Evening was also very successful, but the number attending the visit to the Observer Wild Life Exhibition in London was disappointingly small.

In spite of the severe weather, the winter meetings were carried out as planned, and in January the Wildfowl Trust at Slimbridge was seen under extreme conditions of deep snow and thick ice on the ponds. It is hoped that the fairly full account which is given below of localities visited may be helpful to members who are going to these places privately. As usual a more complete account is kept in the records of the Field Committee. The leaders of meetings are named below.

Jan. 20 : The Wildfowl Trust at Slimbridge ; in addition to the collection, large numbers of wild duck, swans and garden birds were seen, but only few geese. Mr. B. King and Mr. D. A. C. Cullen.

Feb. 3 : A walk along the Severn from Sharpness towards Berkeley. Geese, ducks, herons and larks were seen and a visit to the training ship ' Vindictive ' at Sharpness was made. Mr. H. G. Hockey.

Mar. 2 : Studland, at the entrance to Poole Harbour. At Studland Bay many species of wader and at Littlesea large numbers of geese and ducks were observed. Mr. B. King and Mr. D. A. C. Cullen.

Mar. 8 : Social Evening ; a talk on Mendip Caves and Snowdonia, illustrated by slides, and a film of red squirrels in Shropshire. Mr. J. A. Eatough.

Mar. 27 : Orchardleigh Park, near Frome, by permission of the owner ; woodland and lake birds and early plants were notable, and the tropical bird gardens at Rode, 4 miles N. of Frome seen. Mr. H. G. Hockey.

Apr. 28 : Clevedon to Portishead, by the cliff path: birds, plants, and geological formations. Mr. G. Blackman, Mr.K. Fox, and Mr. D. Peerless.

May 5 : Beer Farm, near Dulverton. The farm in wooded hilly country was visited by kind permission of the owner, Miss P. Massey. Mr. and Mrs. H. G. Hockey.

May 8 : Lord's Wood and Publow. This riverside and woodland walk was spoiled by rain. Mr. D. A. C. Cullen and Mr. I. W. Evans.

May 14 : Bath Botanical Gardens. The Assistant Curator showed us the gardens, including nest boxes, and houses. Miss C. Groves.

May 19 : The Observer Wild Life Exhibition at the R.H.S. Hall, and a visit to Kew Gardens. Mr. H. G. Hockey.

June 2 : Hod Hill, 3 miles N.W. of Blandford, crowned by an Iron Age Camp. The hill has a rich chalk flora and many species of butterflies ; a walk along the cliff from St. Alban's Head to Worth Matravers (near Swanage), provided a rich sea cliff flora and exceptional opportunities to see sea birds at close range. Mr. D. A. C. Cullen, Mr. I. W. Evans and Dr. D. A. Stopher.

June 15 : The Wylye Valley—sites a few miles west of Salisbury. Boyton : heronry ; Teffont Evias : a beautiful village with lake ; Wardour Castle ; Tisbury : a one man quarry of Portland Stone. Mr. F. R. Sterne.

July 6 : Castell Coch, 6 miles N. of Cardiff : a Victorian reconstruction of a mediaeval Welsh castle. Morning, Dr. A. F. Devonshire.
The Welsh Folk museum at St. Fagans, Cardiff. Afternoon, Mr. A. C. K. Fear.

July 10 : The Tumps, a hill just S. of Chew Stoke, and Breach Hill Common, 2 miles S.W. Mr. T. H. Payne and Mrs. J. Pitt.

July 20 : Charterhouse-on-Mendip : old lead workings, with a rich flora, insect life and lizards. Miss G. Robinson and Mr. I. W. Evans.

Aug. 17 : A walk from Combe Down near Bath, via Brassknocker Hill, to Dundas Aqueduct. Mr. F. R. Sterne.

Sept. 8 : A walk along the spectacular deep-cut wooded Lydford gorge on the edge of Dartmoor ; the castle at Lydford ; buzzards were seen feeding young on the ground during a walk over adjoining parts of Dartmoor. Mr. F. R. Sterne and Mr. H. G. Hockey.

Sept. 29 : Dawlish Warren, a sand spit at the mouth of the River Exe, having an interesting dune flora and a large bird population with ducks, terns, and many waders, including several rare species. More waders were seen at Powderham. Mr. D. A. C. Cullen and Mr. B. King.

Oct. 13 : The Brendon Hills, disused iron mines and the mineral railway connecting them to Watchet. Major J. H. Dowling, who gave a talk on the history of the industry, and Mr. H. G. Hockey.

Nov. 16 : A walk along the Kennet and Avon Canal to see birds. A visit to the American Museum at Claverton Manor. Mr. D. A. C. Cullen and Dr. A. F. Devonshire.

A. F. DEVONSHIRE, *Hon. Field Secretary.*

BRISTOL BOTANY IN 1963

By N. Y. Sandwith

1963 WAS again a disappointing year for field-work but, as usual, there have been some interesting finds in our neighbourhood. After that memorable winter, we had hoped for something better than the poor spring and summer which followed. There were good sunny periods only in the first half of June, at the end of July and in September. Both August and September were cool months, October was short of sun, November was wet and December was cold.

In the report of the proceedings of the Seventh Conference (on Local Floras, held in November, 1961) published by the Botanical Society of the British Isles (1963) it is gratifying to note how many speakers praised Mr. White's *Flora of Bristol* as the masterpiece that it is. In one of the discussions, however, one of the younger botanists, seeking to qualify this praise from the modern standpoint, coupled Mr. White's book with Trimen and Dyer's *Flora of Middlesex* (1869) as one of " the early floras ". This indeed made me feel my age, as my name occurs once in the *Flora of Bristol*, and Mr. Ivor Evans is quoted several times as the finder of alien plants. In the opening talk, reported on p. 12, Mr. Gilmour gave the date of publication of Mr. White's book as 1909 : it is, of course, 1912.

The names of principal contributors to the following notes are abbreviated, thus :—

I.W.E., I. W. Evans
G.W.G., G. W. Garlick
R.M.H., R. M. Harley
P.J.M.N., P. J. M. Nethercott
D.M.S., Dr. D. Munro-Smith
A.J.W., Dr. A. J. Willis
J. F. H.-S., Dr. J. F. Hope-Simpson

Records without indication of the finder are my own.

Ranunculus acris L. An apetalous form on a wayside bank, Park Lane, Frampton Cotterell, **G.**, *D.M.S.*, confirmed by *A.J.W.* who refers to Velenovsky in Öst. bot. Z., l, 244–5 (1900).

Thalictrum flavum L. Rhine on Tickenham Moor, **S.**, 1962.

Stellaria neglecta Weihe. The Meads, Lower Morton, north of Thornbury, **G.**, *Dr. D. C. Prowse.*

SMITHSONIAN INSTITUTION

Spergularia media (L.) Presl (*S. marginata* Kittel). The plants from Clevedon, **S.**, see " Bristol Botany in 1962 ", reported as *S. marginata* var. *aptera* (E. S. Marshall), are better referred to var. *angustata* Clavaud, described as a variety of *S. marginata*, fide *J. A. Ratter*, in litt. This variety is still plentiful at Clevedon.

Medicago lupulina L. var. *Willdenowiana* Koch. Ruins below Stoney Hill, Bristol, **G.**, *Miss I. F. Gravestock*, conft. *A.J.W.*

Melilotus altissima Thuill. Rough ground above Backwell Hill House, **S.**, *I.W.E.*

Hippocrepis comosa L. A small patch in Leigh Woods, **S.**, *P.J.M.N.* I have seen no previous record for the Somerset side of the Avon Gorge.

Crataegus oxyacanthoides Thuill. A single tree in Michael Wood, Stone, **G.**, *Dr. L. C. Frost* with *J.F.H.-S.* and *G.W.G.*

Valeriana officinalis L. The late Dr. T. A. Sprague, in *Proc. Linn. Soc.* Session 155, p. 102 (Jan., 1944), in a paper entitled " Field Studies of *Valeriana officinalis* Linn. in the Cotswold Hills ", reported two English specimens at Kew with achenes pilose on one (the one-nerved) face, the rest of the British material having glabrous achenes. The two specimens were from Shapwick, N. Somerset, and from Twickenham, Middlesex. Such specimens, he showed, would be referred in G. K. Kreyer's classification of *V. officinalis* to a var. *secundo-dasycarpa* Kreyer. This variety or form was re-collected by me on Shapwick Heath, **S.**, last July.

Bellis perennis L. A " Hen and Chickens " Daisy was found on the Mead Ridings, Chipping Sodbury, **G.**, by *G.W.G.*

Centaurea Cyanus L. Plentiful in a cornfield at Frenchay, **G.**, *D.M.S.*

Cichorium Intybus L. In great quantity on field-borders between Stanton Prior and Stantonbury Camp, **S.**, *C.H.* and *Mrs. Cummins.*

Crepis biennis L. Winterbourne and Lyde Green, **G.**, *D.M.S.*

Taraxacum palustre (Lyons) DC. Leigh Woods, **S.**, *D.M.S.*, det. *A.C. Jermy* (as *T. paludosum* (Scop.) Schlecht. ex Crép.).

Lysimachia Nummularia L. Streambank at Nettlebridge, **S.**, *F.M. Pilkington.*

Centaurium pulchellum (Sw.) Druce. A large patch in a ride in Michael Wood, Stone, **G.**, discovered by *J.F.H.-S.*, in company with *G.W.G.*, *A.J.W.* and others, on an excursion of the British Ecological Society. This is a first record for the Glos. side of our area.

Orobanche minor Sm. On clover above Backwell Hill House, **S.**, *I.W.E.*

Thymus Drucei Ronn. With white flowers covering an ant-hill on Inglestone Common, Wickwar, **G.**, *D.M.S.*

T. pulegioides L. Rough pasture on Backwell Hill above West Town, **S.**

Marrubium vulgare L. Cross Plain, **S.**, *P.J.M.N.*

Stratiotes aloides L. In rhines on South Moor, a short distance south of Glastonbury, **S.**, *Dr. A. F. Devonshire.* The plant occurs here for over 100 yards and is a first record for the entire county of Somerset as well as for the Bristol district (the locality is, strictly, just outside our limits). The origin of the Water Soldier in this station is still unknown.

Cephalanthera rubra (L.) Rich. A report of the occurrence of this very rare orchid in a beech wood on the Cotswold hills, **G.**, within the limits of our district had never been satisfactorily confirmed, but in September, 1962, the species was at last discovered in another, completely new, station well inside our area, **G.**, by *Mr. D. Dupree.* I was conducted to the spot last July and was shown a vigorous colony with seven flowering specimens. This is the most important addition to our native flora for very many years, and is also a first record for District 5 of Gloucestershire.

Epipactis Helleborine (L.) Cr. Still in Leigh Woods, **S.**, *D.M.S.*

Spiranthes spiralis (L.) Chevall. Cross Plain, **S.**, *P.J.M.N.*

Orchis Fuchsii Druce × *praetermissa* Druce. Bedlam, Great Elm, **S.**, *F. Traylen*, det. *V. S. Summerhayes* and *P. F. Hunt.* About 80 fine specimens were found, " growing in limestone dust from the crusher, some as big as Foxgloves or Delphiniums ". The correct name of this hybrid, by contemporary generic concepts, is *Dactylorhiza* × *Mortonii* (Druce) Soó.

Eriophorum vaginatum L. This species was noted (1956–1960) by *J.F.H.-S.* as a single tuft occurring in heathy bog on Shapwick Heath, **S.** ; see his interesting account of " Plant Communities on Shapwick Heath, Somerset ", published in these *Proceedings* for 1962, vol. xxx (iv), p. 353 (1963). Previously, the only known peat moor station was on Westhay Moor, where *E. vaginatum* is still locally plentiful.

Carex lasiocarpa Ehrh. In quantity in the swampy enclosure where *Cladium* still grows on Catcott Heath, **S.** This species had not before been noted on the peat moors west of the road on Shapwick Heath.

C. paniculata L. A flourishing colony in a marsh in Tyley Bottom, Wotton-under-Edge, **G.**, *G.W.G.* The second locality for the Glos. side of the district ; see "Bristol Botany in 1957 ".

Festuca arundinacea Schreb. Shapwick Heath, **S.**

ALIENS. It was a completely barren year at Avonmouth Dock, **G.**, where recent alterations, extensions and other forms of human activity have destroyed or cleaned up the best areas for adventive plants. We must hope that a hot summer will give rise to a crop of aliens defeating all attempts to keep the railway tracks tidy.

Cotoneaster frigidus Wall. ex Lindl. One young tree in Leigh Woods, **S.**, *P.J.M.N.*, who remarks that this is the fourth species of *Cotoneaster* found naturalized in the Avon Gorge.

C. microphyllus Wall. ex Lindl. One bush, Wavering Down, **S.**, *P.J.M.N.*

Dipsacus strigosus Willd. "Bristol, **G.**, 1858, *J. Smith* " in Herb. Mus. Brit., see *A. Hansen* in *Proc. B.S.B.I.* 5(2), 124 (1963). This is an alien species which has escaped from botanic gardens at Kew, Oxford and Cambridge, and has been confused with *D. pilosus* L. It is a native of the Black Sea region and W. Asia, found as an adventive in a number of countries in Continental Europe.

Galinsoga ciliata (Raf.) Blake. On a compost heap at the Ridge, Yate, **G.**, *G.W.G.*

Tagetes minuta L. The Malt House, Hinton Charterhouse, **S.**, *C.D. Brickell*, comm. *D. McClintock.*

Doronicum Pardalianches L., *Campanula latifolia* L. and *Lilium Martagon* L. occur naturalized with other planted species in and near woodland on the former Backwell Hill House estate, **S.**, *J. Abrams* and *I.W.E.*

Cyclamen hederifolium Ait. A small patch in Leigh Woods, **S.**; probably an outcast from a garden in North Road, *P.J.M.N.*

Calystegia pulchra Brummitt et Heywood. On a fence, Westerleigh Road, Downend, **G.**, *D.M.S.*, det. *R. K. Brummitt.* This has pink corollas and somewhat inflated bracteoles, as well as minute hairs on some of the vegetative parts. It is probably passed over as a pink-flowered form of *C. silvatica* (Kit.) Griseb. (*C. sylvestris* (Willd.) R. et S.). Both these naturalized aliens are treated as subspecies of our native *C. sepium* (L.) R. Br. in the second edition of the *Flora of the British Isles* (1962). This is the first record of *C. pulchra* for Bristol and for vice-county 34, W. Gloucester.

Rumex scutatus L. Roadside, Winterbourne Down, **G.**, *D.M.S.*

Laurus nobilis L. A bush on a rather inaccessible cliff low down on St. Vincent's Rocks, and another in woodland north of the Great Quarry, Avon Gorge, **G.**, *P.J.M.N.* Previously mentioned as a planted shrub near the Suspension Bridge by *J.F.H.-S.* and *A.J.W.* in their account of the vegetation of the Bristol district written for the meeting of the British Association in 1955; see *Bristol and its Adjoining Counties*, p. 105 (1955).

Elodea callitrichoides (Rich.) Casp. According to the views of Prof. H. St. John, monographer of the genus *Elodea*, the plant which has occurred in Britain, and in our district at Limpley Stoke and Bath, **S.**, as an aquarist's " throw-out " is not *E. callitrichoides* but should be referred to a closely related South American species, *Elodea Ernstae* St. John. The two taxa are contrasted in his paper on the South American species of *Elodea* in *Darwiniana*, 12, pp. 639–652 (1963).

Echinochloa crus-galli (L.) Beauv. One plant (awnless form) on side of road (December) near Clifton Down Station, **G.**, *Miss E. Chittenden*, det. *B. C. Lamb*, conft. *A.J.W.*

BRYOPHYTES. *Nowellia curvifolia* (Dicks.) Mitt. On fallen timber in Nightingale Valley, Leigh Woods, **S.**, May, 1962, and fruiting, 1963, *C. E. Ridsdale ; ibid.*, Sept.–Oct., 1963, *G.W.G.*, *R.M.H.*, *A.J.W.*, and other members of the British Bryological Society ; and found independently by *P.J.M.N.*

Ptilidium pulcherrimum (Weber) Hampe. Nightingale Valley, Leigh Woods, **S.**, *G.W.G.*, *R.M.H.*, *A.J.W.* and others.

Fissidens minutulus Sull. var. *tenuifolius* (Boul.) Norkett. On rock fragments in Nightingale Valley, Leigh Woods, **S.**, *Dr. E. F. Warburg*. New record for v.c.6, N. Somerset.

Distichium capillaceum (Hedw.) B. et S. Floor of quarry, Leigh Woods, **S.**, *R.M.H.* and others. New record for v.c.6.

Dicranella Schreberana (Hedw.) Dixon. Oldbury Court Woods, **G.**, *D.M.S.*

Dicranum montanum Hedw. On fallen timber, with *Nowellia curvifolia*, Nightingale Valley, Leigh Woods, **S.**, *R.M.H.* and others. New record for v.c.6.

Gymnostomum calcareum Nees et Hornsch. Quarry, Leigh Woods, **S.**, *Mrs. J. Appleyard* and others.

Bryum donianum Grev. Quarry, Leigh Woods, **S.**, *F. H. Perring.*

Heterocladium heteropterum (Bruch) B. et S. On sandstone rocks, Glen Frome, Stapleton, **G.**, *D.M.S.*, det. *J. H. Tallis.*

Plagiothecium sylvaticum (Brid.) B. et S. Fruiting, in a small wood, Winterbourne Down, **G.**, *D.M.S.*, det. *S. W. Greene.*

Once again I am indebted to Dr. Willis for his help in assembling records and confirming specimens.

BRISTOL BIRD REPORT
1963

COMPILED BY THE EDITORIAL COMMITTEE OF THE
B.N.S. ORNITHOLOGICAL SECTION

P. J. CHADWICK
H. H. DAVIS
G. SWEET
M. A. WRIGHT

SYSTEMATIC records below are those of chief importance for the year and unless otherwise stated refer only to 1963. With observation cards far outnumbering the total returned for any previous Report, acknowledgment is due to all contributors.

Seldom in a single year have so many highly interesting events been recorded. From the New Grounds a Red-breasted Goose, a Marsh Harrier, an Osprey and a Red-necked Phalarope were reported and scarce visitors to the reservoirs included a Purple Heron, a Velvet Scoter and an Aquatic Warbler at Blagdon, and a Marsh Harrier, Spotted Crakes, a Spotted Redshank (summer plumage), a Temminck's Stint and a Shore Lark at Chew Valley. Among coastal records are those of an Eider at Sand Bay, a Pomarine Skua at Clevedon, and a Long-tailed Duck, a Roseate Tern and Bee-eaters at Weston-super-Mare. Other unusual visitors were a Hoopoe near North Nibley, a Golden Oriole in Leigh Woods and a Waxwing near Cheddar.

A summarised account of the prolonged and exceptionally severe winter of 1962–63 and its effect on local bird-life is given at the end of this Report. Additional Steep Holm records for 1963 are contained in the recently issued *Report of the Steep Holm Gull Research Station.*

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Headings **G.** and **S.** refer to South Gloucestershire and North Somerset, and cover the areas as outlined in previous Reports (cf. *Proc. B.N.S.*, 1960, p. 114).

GREAT NORTHERN DIVER *Gavia immer*

S. Single bird, Chew Valley res., Dec. 7 (R.J.L.).

RED-THROATED DIVER *Gavia stellata*

S. One (oiled), Chew Valley res., Mar. 24 (R.J.P.). Another (also oiled), dead on beach, Weston-s-Mare, Dec. 27 (R.A.).

GREAT CRESTED GREBE *Podiceps cristatus*

G. One on Estuary, New Grounds, June 7, July 2 (L.P.A.).

S. Absent from reservoirs, Jan. to mid-March, except Cheddar (which did not completely freeze) where max. of fifteen, Jan. 10, and 20, Mar. 3 (J.A.McG.). Total of 35, all waters, Mar. 17 (B.R., W.J.S. *et al.*) and 50 on 30th (P.J.C., B.K.). At least 20 broods, Chew Valley res. (B.K., R.J.P. *et al.*) and five, Blagdon res. (P.J.C., T.B.S.). Several high autumn counts, Chew Valley: 97, Sept. 21 (B.K., R.J.P., B.R.); 93, Dec. 14 (R.J.P.); 86 on 15th (P.J.C., M.A.W.), and seventeen, Cheddar, same date (J.A.McG.). 96, Chew Valley, Dec. 20, including compact flock of 81 (R.S.H.) but birds dispersed following extensive icing of reservoir on 21st. 45, Cheddar res., Dec. 28 (R.A.) and 39 on 31st (B.R.).

SLAVONIAN GREBE *Podiceps auritus*

S. One, Cheddar res., Jan. 13 (J.A.McG.) and another, R. Avon, Bath, Jan. 24 (R.J.L.) and 27th (R.M.C., B.K. *et al.*).

BLACK-NECKED GREBE *Podiceps nigricollis*

S. Single birds, Blagdon res., Oct. 6 (P.J.C.); Cheddar res., Nov. 23 – Dec. 1 (R.M.C., P.H. *et al.*) and Chew Valley res., Nov. 30 (R.A.).

MANX SHEARWATER *Procellaria puffinus*

S. One dead on beach, Sand Bay, May 26 (R.A.).

FULMAR *Fulmarus glacialis*

S. One, perhaps two, off Steep Holm, Aug. 27 (Res. Stn.).

GANNET *Sula bassana*

S. Dead adult, Sand Bay, Apr. 7 (R.A., T.B.S.). One (ad.) floating in sea off Brean Down, Aug. 18 and this, or another, Weston Beach, on 19th (R.A.). First-summer bird in flight off Steep Holm, Aug. 26; at least four (1 ad.), possibly six, Sept. 26, and ad. on 27th (Res. Stn.). Dead ad., Sand Bay, Nov. 3, and Weston Beach on 16th (R.A.).

SHAG *Phalacrocorax aristotelis*

S. One in flight, Blagdon res., Sept. 21 (B.K., R.J.P.) and ad. viewed in flight, 20 yd. range, Brean Down, Dec. 8 (T.R.J.W.).

HERON *Ardea cinerea*

S. Only 26 occupied nests reported—the lowest census count, 1951 to date (per B.K.). Despite high breeding population in 1961 (66 nests) some evidence of gradual decline since 1951 :—

	Average number of nests			Total
	1951–54	1955–58	1959–62	1963
Brockley Combe	34	29	21	4
Cleeve Hill, Cleeve	—	—	—	10
Uphill Grange	23	21	23	9
Newton St. Loe	—	1	3	3
Total	57	51	47	26

PURPLE HERON *Ardea purpurea*

S. Immature, Blagdon res., May 12 – 16: first seen by R.J.P. and subsequently by many observers. Record, first for the county, accepted by *Brit. Birds* Rarities Committee.

CATTLE EGRET *Ardeola ibis*

S. One feeding in orchard, Portbury, various dates, Oct. 29 to mid-Nov. (J.H. *et al.*); bird, unringed, also seen on farm walls and in normal flight.

BITTERN *Botaurus stellaris*

S. Single bird, Chew Valley res., Dec. 14, 27 (R.A.).

MALLARD *Anas platyrhynchos*

G. and **S.** Counts from the New Grounds, reservoirs and coast from Clevedon to Brean Down similar to 1962 with totals of 3,900, Jan. 13, and 2,650, Feb. 17. After highly successful breeding season, total in area rose from 3,350, Sept. 15, to 3,850, Oct. 13, but fell to *c.* 2,700, Nov. 17 (total counts approx., some coastal areas not always covered).

Brood counts: *c.* 80, Chew Valley res.; 9, Blagdon res.; 2, Barrow Gurney resrs.; 2, Litton res.; and 1, Kenn Moor.

TEAL *Anas crecca*

G. Relatively few, New Grounds, Jan. to March: max. count —210, Feb. 24; autumn counts, same place: 265, Sept. 12; 350, Nov. 6, and 680 on 24th (W.T.).

S. Majority left area during Jan. (*c.* 250, Jan. 13) but returned early Feb. with 1,250 – 1,500 present, Feb. 16. 500 still present, Chew Valley res., Apr. 3, but only nine on 10th. Influx of males, same res., mid-June (45 on 19th and 23rd). Autumn counts all less than 100 except at Chew Valley and total of less than 1,000 in area (various observers). Adult ♂, ringed, Aberton, Essex, 21/8/59, retrapped there, 19/12/62 and shot, Wick St. Lawrence, near Clevedon, 28/1/63 (per H.R.H.).

GARGANEY *Anas querquedula*

G. New Grounds: six in W.T. enclosures, Apr. 5; pair, July 1, 2, and two, Aug. 22; single bird arrived, Nov. 1, and stayed about a week (L.P.A., M.A.O.).

S. First noted, Mar. 21—pair, Chew Valley res. (J.R.B., C.L.) where two young subsequently reared (B.K.). Autumn records to mid-Sept. from Chew Valley and Blagdon resrs. (various observers).

GADWALL *Anas strepera*

G. Max. counts, New Grounds: 28, Jan. 14; 22, Feb. 25, and 42, Oct. 17 (W.T.).

S. The only reservoir records, Jan. to end March, are from Blagdon: one, Jan. 6, and pair, Feb. 24 – Mar. 17; pair also present, same res., May 4, June 22, 26 (J.R.B., P.J.C., R.M.C. *et al.*). Pair, Axe Estuary, Mar. 3 (R.A.). First noted, Chew Valley res., Mar. 24, and subsequently about six pairs bred (B.K., R.J.P. *et al.*); summer/autumn counts, same res., include 60, Sept. 15 (N.R.W., K.B.Y. *et al.*). Total later divided between Chew Valley and Blagdon and gradually dispersed—46, Oct. 13; 36, Nov. 3, and 26, Dec. 5 (P.J.C., R.M.C., C.L., M.A.W. *et al.*).

WIGEON *Anas penelope*

G. New Grounds: 400, Jan. 14, and 420, Feb. 24; 150, Oct. 17, increasing to 1,400, Nov. 6; 840, Nov. 24 (W.T.).

S. Total of less than 60, mid-Jan. (cf. over 1,430, Dec. 26, 1962) but increase to 250, Feb. 3, and 1,000 on 9th (750, Axe Estuary) ; numbers nearly doubled by Mar. 3 (1,000, Stoke Moor, nr. Cheddar). First autumn arrivals, Aug. 31, but no large numbers until end Nov. : slight increase mid-Dec. onwards—1,250, Dec. 15 ; 1,650, Dec. 22, and over 2,000 on 26th (various observers).

PINTAIL *Anas acuta*

G. Counts from the Estuary, New Grounds, include : 200, Jan. 14 ; 130, Feb. 24, and 80, Dec. 1 (W.T.).

S. No large numbers reported. Max., all waters—26, Feb. 24 ; 31, Oct. 13, and 35 on 26th ; 27, Nov. 3 (G.L.B., R.J.L., W.J.S. *et al.*).

SHOVELER *Spatula clypeata*

G. New Grounds records include : 56, Jan. 14, and 85 on 31st ; 28, Sept. 15, and 30, Dec. 30 (W.T.).

S. Sixty-five, Chew Valley res., Jan. 4 (S.E.C.), thereafter majority at Cheddar res.—30, Feb. 24 (J.R.B.) and 35, Mar. 3 (J.A.McG.)—until Mar. 23 when 60 seen, Chew Valley (R.A.) where breeding population of approx. eight pairs but only two broods noted (R.J.P. *et al.*). Max. autumn counts : 100, Chew Valley res., Aug. 31 (B.K.), Sept. 1 (P.J.C.) and total, all waters, of *c.* 115, Oct. 26 (B.K., R.J.P.) but only 25, Dec. 15 (B.R., M.A.W. *et al.*).

RED-CRESTED POCHARD *Netta rufina*

S. Single female, Cheddar res., Nov. 2 – Dec. 1. (R.M.C., P.H., J.A.McG. *et al.*).

SCAUP *Aythya marila*

S. Usual winter reports from reservoirs of up to three or four, and single birds in autumn, but also present during summer—single male, Blagdon, June 15 – 27 ; three, July 14, and one, Chew Valley, July 12–21. Other records : female, R. Avon, Bath, Jan. 23 – Feb. 16 ; three, Weston Bay, Nov. 3, 9, and one on 17th (various observers).

TUFTED DUCK *Aythya fuligula*

G. Seventy in W.T. enclosures, New Grounds, Jan. 14 : 95, Jan. 29, and 90, Feb. 25 ; 70–100 regularly flighting into enclosures from Frampton gravel pits, Nov. to end of year (W.T.).

S. Comparatively few in area, Jan., but increase from mid-Feb.—500, all waters, Mar. 17, and 550 on 30th (P.J.C., S.E.C. *et al.*). Spring passage peak of 530, Chew Valley res., Apr. 27

where 100–125 pairs in May and 60–80 broods subsequently noted (B.K., R.J.P. *et al.*). Adult with two young, Barrow Gurney resrs., July 23 (T.B.S.). Late summer/autumn counts include: 550, all waters, mid-Sept.; 600, Oct. 6, Nov. 17, and 730, Dec. 15 (C.L., R.J.L., B.R., C.S. *et al.*).

POCHARD *Aythya ferina*

G. Reported during very cold weather, New Grounds: fourteen, W.T. enclosures, Jan. 14, and 60 on 23rd; 120 on river, Feb. 27 (W.T.).

S. With freezing of reservoirs duck congregated at Cheddar where 870 noted, Jan. 13 (total of 8, other resrs.) but probably less than 100, all waters, on 20th (D.C., P.H., J.A.McG. *et al.*). Numbers increased again to 500 – 600, Jan. 27 – Mar. 2 (J.R.B., T.B.S. *et al.*). Up to a dozen, Chew Valley res., May – June, where four or five pairs bred (B.K., R.J.P. *et al.*). Up to 40 males, Blagdon and Chew Valley resrs., mid- to end June. Autumn arrivals from early Sept. but total in area well below normal, e.g. only 580, Dec. 15—cf. *Proc. B.N.S.*, 1962, p. 314, and 1961, p. 249 (A.A.C., P.J.C., K.L.F., W.J.S. *et al.*).

GOLDENEYE *Bucephala clangula*

S. Party of 20, Chew Valley res., Jan. 4 (S.E.C.), 5 (B.K.) but only six, all waters, on 13th when Chew Valley and Blagdon frozen (J.A.McG. *et al.*). One on moat, Bishop's Palace, Wells, Jan. 22 – Feb. 6 (W.J.H.H.). Total increased to nine, all waters, Feb. 17, and 15 on 24th; 23, Mar. 3 (J.R.B., H.H. *et al.*). 50, Chew Valley res., Mar. 8 (R.S.H.); 84 (12♂♂) at dusk on 30th (P.J.C.) and 88 (10♂♂), Apr. 3 (B.K.); 30, Apr. 15 (P.J.C.) and six on 30th (B.K.). Again present from Oct. 13: total, all waters – nine, Nov. 24 (J.A.McG., W.J.S. *et al.*) and 27, Dec. 15 (B.R., R.J.L. *et al.*), but 23, Chew Valley, Dec. 14 (R.J.P.) and up to 26, Dec. 22, 28 (A.A.C., M.K. *et al.*).

LONG-TAILED DUCK *Clangula hyemalis*

S. One, marine lake, Weston-s-Mare, Dec. 21 – 28 (R.A.).

VELVET SCOTER *Melanitta fusca*

S. One, considered imm. male, Blagdon res., Dec. 15 – 28 (R.M.C., B.K., M.K. *et al.*).

COMMON SCOTER *Melanitta nigra*

S. Pair, Barrow Gurney resrs., Apr. 10 (T.B.S.); three males, Cheddar res., Apr. 14 (J.A.McG.) and Weston Bay on 27th

(E.M.P. *et al.*). Adult male, Chew Valley res., May 4 (B.K.). Also seen, Weston Bay, in autumn—three females or imms., Nov. 9 (E.G.H.) and two, Dec. 1 (R.F., T.R.J.W.).

EIDER *Somateria mollissima*

S. Female on mudbank, Sand Bay, Aug. 2 (R.A.).

RED-BREASTED MERGANSER *Mergus serrator*

G. Male on Estuary, New Grounds, Mar. 31 and 'brown-head', Aug. 15, Sept. 1 (L.P.A.).

GOOSANDER *Mergus merganser*

S. Exceptional numbers in area, early Jan. Party of 21 (12♂♂), Chew Valley res., Jan. 4 (S.E.C.) and at least 43 (6♂♂) on 5th (S.E.C., B.K.). Nineteen, same place, Jan. 6 (B.R.), on which date ten, Barrow Gurney resrs. (P.J.C.) and two, Blagdon (S.E.C.). Smaller numbers, Jan. 13 to end March but at least 30, Cheddar res., Mar. 2 (F.G.H., H.H.). Single birds, R. Avon, Saltford, Jan. 26 (B.K.), 27 (P.T.S.) and Feb. 24 (B.K.), and Hotwells, Bristol, Feb. 4 (G.W.J.) ; also in Axe Estuary, on 10th (R.A.). Two, Stoke Moor, nr. Cheddar, Mar. 2 (T.B.S.). Two 'brown-heads', Chew Valley res., Dec. 15, and male on 28th, 29th (R.J.L., B.R. *et al.*).

SMEW *Mergus albellus*

G. Single females, Ship Canal, Slimbridge, Jan. 26, and in W.T. enclosures, Feb. 14, Apr. 8 (L.P.A., P.S.).

S. Fifteen (3♂♂), Chew Valley res., Jan. 4 (S.E.C.) and 6th (B.R.). Total of eight in area, Feb. 23, and up to five (2♂♂), Chew Valley res., Mar. 9 – 17 (C.S. *et al.*) with four still present, Apr. 7 (P.J.C., M.A.W.). Up to four (1♂), Chew Valley res., Dec. 14 – 31 (S.I.B. *et al.*), and single birds, Blagdon res., Dec. 15 (C.L., K.B.Y.) and Cheddar res. on 31st (B.R.).

NORTH AMERICAN RUDDY DUCK *Oxyura jamaicensis*

S. Up to three in area, Jan. – Feb., usually at Chew Valley res. where two pairs later bred (B.K., R.J.P., M.A.W. *et al.*). Frequently noted Blagdon and Chew Valley resrs., Nov. – Dec. (R.B., M.K. *et al.*), max. count being fourteen, Blagdon, Dec. 28 (T.R.J.W.) when one present, Cheddar res. (R.A.).

SHELDUCK *Tadorna tadorna*

G. Max. of 169 (52 juvs.=6 broods), New Grounds, June 15 (W.T.).

S. Annual coastal survey in breeding season showed marked reduction : max. count—445 (*c.* 150 juvs.=21 broods), third week June (per S.M.T. who amends 1962 total to 636 (240 juvs.). Frequently recorded, Chew Valley res., Feb. 2 – June 5, with max. of eleven, Apr. 30, but no broods seen (G.E.C., E.M.P., W.L.R. *et al.*) ; noted, same res., Dec. 15 – 29, with seven on 27th (A.A.C., B.R., M.A.W.). Pair, Barrow Gurney resrs., May 6 (T.B.S.).

GREYLAG GOOSE *Anser anser*

G. Single bird, New Grounds, Mar. 3 (L.P.A., M.A.O.).

S. Party of eight standing on frozen reservoir, Cheddar, with flock of *c.* 250 White-fronts close by, Feb. 24 (M.W.S.).

WHITE-FRONTED GOOSE *Anser albifrons*

G. New Grounds : large total (*c.* 3,000) late in previous Dec. fell sharply in severe cold to 800, Jan. 2, and only 25 on 19th—but immediate increase to 600, Feb. 9 ; 1,450 on 17th, and 3,000 by 28th, this number remaining to Mar. 25 when final departure began (W.T.). Autumn arrivals, New Grounds, again very late : seven, Oct. 23, with slow increase to 500, Dec. 14, and 2,000 by end of year (W.T.). Flocks, usually small, noted, Jan. – early Mar., over Shirehampton, Filton and parts of Bristol (J.R.B., R.H.P. *et al.*).

S. Records, coastal and inland, include : 60, Worlebury, and 33, Bath, Jan. 1 ; 56, Sand Bay, Jan. 5, and 200 on 12th ; up to 250 (usually on ice), Cheddar res., various dates, Jan. – Mar. ; 80, Weston-s-Mare, Jan. 20 ; 90 over Clapton-in-Gordano, Jan. 26 ; 400, Uphill, Feb. 7, and Yeo Estuary, Dec. 31 ; and small numbers, Chew Valley res., Feb. – Apr. and Dec. (many observers).

LESSER WHITE-FRONTED GOOSE *Anser erythropus*

G. One with common White-fronts, New Grounds, Feb. 27, 1962 (K.D.E.). Record accepted by *Brit. Birds* Rarities Committee.

BEAN GOOSE *Anser fabalis*

G. Party of four, New Grounds, Feb. 28 (M.A.O.).

PINK-FOOTED GOOSE *Anser brachyrhynchus*

G. Single bird, New Grounds, Feb. 27—the only winter record (W.T.). Autumn arrivals, same place : 28, Sept. 28, with increase to 42 on 29th, but birds left same day, not returning (W.T.).

BARNACLE GOOSE *Branta leucopsis*

G. Two, New Grounds, Feb. 17 (W.T.), Mar. 3 (R.J.P.) and party of eight, Dec. 18 – 31 (W.T.).

S. Four in fields with 200 White-fronts, Sand Bay, Jan. 12 (R.A.).

CANADA GOOSE *Branta canadensis*

G. Sixty (probably birds from feral stock at Frampton-on-Severn), New Grounds, Jan. 20 (B.R.).

S. One, Yeo Estuary, Feb. 17 (R.J.P.) and twenty on ice, Cheddar res., on 23rd (B.R.). Two, Chew Valley res., various dates, early Mar. to mid-Apr. (many observers) and three, Apr. 30 (C.S.).

RED-BREASTED GOOSE *Branta ruficollis*

G. Single bird (no ring and considered wild) arrived New Grounds with influx of White-fronts and was first seen, Dec. 31 ; still present, early Jan., 1964 (W.T.).

WHOOPER SWAN *Cygnus cygnus*

S. Seven (6 ads.), Cheddar res., Jan. 13 (J.A.McG.) and two ads., Chew Valley res., Mar. 10 – 24 (R.A., J.R.B., C.L. *et al.*).

BEWICK'S SWAN *Cygnus columbianus bewickii*

G. Counts, New Grounds : 28, Jan. 2 ; 21, Mar. 1 ; six, Apr. 9, and one, May 3 ; five, Dec. 17, with fifteen on 28th, and 26 on 30th—birds regularly feeding in W.T. enclosures (W.T.).

S. Two ads., Chew Valley res., Jan. 2 – Mar 2 (K.L.F., R.S.H. *et al.*); up to seven, Mar 8–24 (R.M.C. *et al.*); three ads. still present, Apr. 7 (P.J.C., M.A.W.). Four ads., Blagdon res., Jan. 6 (S.E.C.) and fourteen (8 ads.), Cheddar res. on 13th (J.A.McG.). Autumn records : three (2 ads.), Blagdon, Oct. 26, which moved to Chew Valley and remained until Nov. 17 (A.H.D., B.K., W.J.S. *et al.*). Ten (5 ads.), Chew Valley, Dec. 8 (M.A.W. *et al.*) ; 16, Dec. 14 (R.J.P.) and 18 on 15th (S.I.B.) ; 27 (14 ads.), Dec. 17 (D.W.) and 27 (16 ads.) on 21st (R.J.P.).

BUZZARD *Buteo buteo*

G. Five birds, at least two juvs., Wotton-under-Edge, Aug. 4 (L.P.A.). Single birds, Michael Wood, May 26 (A.P.R.) ; New Grounds, Oct. 28 (L.T.C.S.).

S. Reported all months except Jan. Breeding or breeding season records from Bleadon (one young reared) ; St. Catherine's Valley, nr. Bath (probably bred—four seen constantly, Sept.) ; Mendip area ; Goblin Combe ; Saltford and Marksbury (H.G.H., R.S.H. *et al.*).

SPARROWHAWK *Accipiter nisus*

G. Single birds, Stoke Gifford, Jan. 3, and several dates, Dec.; Southmead, late Jan. (R.H.P.); Compton Greenfield, Apr. 22 (P.J.C.); Frenchay, Nov. 17 (P.L.G.); and New Grounds, various dates, Apr. – Dec. (L.P.A. *et al.*).

S. Reported all months (109 sightings) with breeding season records from Weston area, Loxton, Cheddar, Shipham, Churchill, Blagdon res. (pair with one fledged young, Aug. 11 (P.J.C.)), Chew Valley res., Wrington (pair with two juvs., Aug. 29 (M.K.)), Whitchurch, Portishead, Leigh Woods, Long Ashton and Bath area (R.A., D.R., D.W. *et al.*).

MARSH HARRIER *Circus aeruginosus*

G. One, probably imm., New Grounds, late p.m., Apr. 24, in level flight and soaring to evade mobbing rooks (L.P.A.).

S. Female or imm., Chew Valley res., Sept. 15 (R.J.L.).

OSPREY *Pandion haliaetus*

G. One, first-summer, New Grounds, late p.m., July 22, seen by L.P.A., who records the entire gull and wader population on stretch of estuary rising in panic as bird approached from down-river. Full details supplied.

HOBBY *Falco subbuteo*

G. Single birds, New Grounds, Aug. 7, 23, 24, Sept. 11 (L.P.A.).

S. Single birds, Yeo Estuary, Apr. 27 (J.R.B.); Chew Valley res., May 1, June 22, 27, Aug. 11, 17, 20, 21, 22, (♀) 29 (R.S.H., R.F.T., K.B.Y. *et al.*); Saltford, May 18 (B.K.); Priddy, June 15 (R J.P.) and Brean Down, Sept. 17 (R.A.). One, Saltford sewage farm, July 19 (P.J.C., M.A.W.); pair and single bird later, same place, Sept. 14 (P.J.C., G.S.).

PEREGRINE *Falco peregrinus*

G. One, St. George, Bristol, Jan. 7 (W.J.S.). Two (♂♂), New Grounds, Feb. 17; ♂, Oct. 4 – end of year (L.P.A., H.J.B., M.A.O.).

S. Single birds, Barrow Gurney resrs., Jan. 27 (W.J.S.); Chew Valley res., Feb. 17 (R.M.C., B.K., P.T.S.), Mar. 16 (B.K., R.J.P.), 17 (A.A.C.), 23 (R.A.) and Oct. 22 (S.I.B.); Bath, Sept. 30 (G.S.); Blagdon, Dec. 7 (G.S.); Brean Down, Dec. 7 (T.R.J.W.) and Bristol on 24th (D.W.).

MERLIN *Falco columbarius*

G. Single birds, New Grounds, Feb. 1, (♀) 20, (♂) 27 (L.P.A.); Dunkirk, nr. Badminton, Aug. 16 (H.H.D.).

S. Single birds, Chew Valley resrs., (♂) Feb. 16, 17 (R.F.T.); Mar. 16 (B.K., R.J.P.) and Oct. 27 (W.J.S.).

KESTREL *Falco tinnunculus*

G. and **S.** Evidence of breeding from **G.**—New Grounds (W.T.); pair with two juvs., Conham and Hanham Woods (A.H.D.) and **S.**—♂ carrying food, Ashton Park, June 11 (P.J.C.); pair and one juv., Brean Down, Aug. 6 (R.A.); pair with four young, Chew Valley res., July 21 (W.J.S.) and up to three, elsewhere in same locality, throughout year (R.F.T.). Other breeding season records from **G.**—Filton and **S.**—Leigh Woods, Long Ashton, Brockley, Kenn and Yatton Moors, Clevedon, Wick St. Lawrence, Wavering Down, Cheddar Gorge, Wells, Chewton Mendip, Whitchurch and Saltford. Decrease mentioned (R.S.H., M.K., W.L.R.).

RED-LEGGED PARTRIDGE *Alectoris rufa*

S. One heard, Sand Point, May 5 (R.A.); two, same place, May 25, 28, 29 (T.B.S.); one, nr. Failand, July 7 (K.B.Y.). At least three, Wrington Warren, Dec. (A.E.R.).

QUAIL *Coturnix coturnix*

G. One calling, Marshfield, June 8 (R.M.C.); at least three, same place, Aug. 6 (A.E.B., J.D.R.V.).

WATER RAIL *Rallus aquaticus*

S. Single birds, nr. Ubley, Jan. 13, Mar. 3 (P.J.C.); nr. Radstock, Jan. 19 (C.S.) and Saltford on 27th (P.H.). Five, Sand Bay, Jan. 20 (H.A.T.) and one, Sept. 18 (R.A.). Chew Valley res.: single birds, Aug. 17 – end of year, with two, Dec. 1; six on 22nd (W.J.S.) and at least seven (three trapped) on 26th (M.R.G.).

SPOTTED CRAKE *Porzana porzana*

S. One imm., Chew Valley res., Aug. 18 (P.J.C.), still present on 24th (M.J.B., P.J.C.). Ad., same place, Aug. 24 (P.J.C., M.K., G.S. *et al.*) to 31st (B.K.); one, Oct. 10 (R.S.H.). Two juvs. ringed, Aug. 24, 25; at least three present, end Aug. (M.R.G.).

CORNCRAKE *Crex crex*

S. One heard, Saltford, several dates, June (P.T.S.).

COOT *Fulica atra*

S. Peak counts, reservoirs : 3,600, Cheddar, Feb. 17, and 2,400, Dec. 15 (J.A.McG.) ; 2,000, Chew Valley, Aug 28 (B.K.) ; 400, Blagdon, Sept. 21 (B.K., R.J.P.) and 1,050, Oct. 6 (P.J.C.). Breeding season, Chew Valley res. : 52 nests, 24 birds sitting (249 counted), May 24 (C.S.) ; 33 nests, May 31 (B.K.) ; eight broods, June 22 (B.K.) and seventeen, July 7 (R.J.P.).

OYSTERCATCHER *Haematopus ostralegus*

G. New Grounds : single birds, various dates, late Apr. to mid-Sept. ; two, Nov. 4, and four on 24th (L.P.A., M.A.O.).

S. Few coastal records. Weston Bay – Sand Bay : max., 48 (a low figure), Oct. 12 (R.M.C.). Chew Valley res. : three, Feb. 9 (K.L.F.) ; four, Aug. 29 (S.I.B.) ; one, sometimes two, Nov. – Dec. (various observers).

LAPWING *Vanellus vanellus*

G. and **S.** High total of 3,000, New Grounds, Aug. 5 (L.P.A., M.A.O.). Six pairs, Chew Valley res., Apr. – Aug. ; other breeding season records, up to three or four pairs, from Blagdon res., Clevedon, Easton-in-Gordano, and Nailsea and Kenn Moors.

RINGED PLOVER *Charadrius hiaticula*

G. Max. spring and autumn totals, New Grounds : over 360, May 31, and 500, Aug. 11 (L.P.A.).

S. Chew Valley res. : sixteen, May 4 (K.L.F.) ; up to fifteen, Aug. – Sept. (various observers) and three, Oct. 20 (R.J.P.). Sand Bay : 57, May 24 (T.B.S.) and 200, Aug. 18 (R.A.).

LITTLE RINGED PLOVER *Charadrius dubius*

G. Adult, New Grounds, June 9, and single imm., July 20–30 (L.P.A.).

S. Two, Chew Valley res., Apr. 28 (G.E.C., H.H.D., H.H.) and one imm., July 14 (J.A.McG.).

GREY PLOVER *Charadrius squatarola*

G. New Grounds : six, June 5 ; seven, Oct. 14, and seventeen on 17th (L.P.A., M.A.O.).

S. Weston Bay – Sand Bay : one, Jan. 5, Feb. 16 (R.A.) ; up to four, Sept. 21 – Oct. 27 (various observers) ; thirteen, Nov. 3 (R.A.) ; three, Dec. 22 (T.B.S.). Fourteen, Yeo Estuary, Dec.

28 (M.K.). Inland records : ten, Nailsea Moor, Feb. 24 (H.R.H.); one, with Golden Plover, Burnett, Apr. 15–21 (P.H., B.K., P.T.S.) ; single birds, Blagdon res., Mar. 3 (M.W.S.) and Chew Valley res., Sept. 22 – Oct. 20 (R.M.C., R.S.H., W.J.S.).

GOLDEN PLOVER *Charadrius apricarius*

G. Three of northern race, *C. a. altifrons*, New Grounds, Apr. 7. Max. winter count, same place, 30, Nov. 4 (L.P.A., M.A.O.). Five, Severn Beach, Oct. 12 (B.G.) ; six nr. Mangotsfield, Dec. 27 (P.L.G.).

S. Records include : up to 40, Chew Valley res., Feb. – Mar., Oct. – Dec. (various observers) ; 74, Priddy, Mar. 3 (R.S.H.) and *c.* 20, Oct. 23 (J.A.McG.). Burnett – Marksbury area : *c.* 350, mid-Apr., including twenty or more of northern race on 16th (P.H.) and 17th (P.H., B.K., P.T.S.) ; 250, Nov. 24 to end of year (R.M.C., P.T.S.). About 1,500 grounded by fog, Charmy Down, Bath, Nov. 6 (R.J.L.) ; 88, Barrow Gurney, Dec. 24 (T.B.S.) ; *c.* 100, nr. Cheddar on 28th (R.A.).

TURNSTONE *Arenaria interpres*

G. Up to four on Estuary, New Grounds, Apr. 25 – Aug. 11 (L.P.A.).

S. Small numbers (max. 8), coastal areas, Weston – Clevedon, various dates, Jan.–May and Aug.–Dec. (several observers) ; 200 or more, mouth R. Avon, Apr. 15 (K.B.Y.). Chew Valley res. : single birds, Apr. 21 (B.K., R.J.P.), May 12 (R.J.P., B.R. *et al.*), Aug. 17 (R.A.) and two, Aug. 21–28 (many observers).

JACK SNIPE *Limnocryptes minimus*

S. Single bird on tide line in hard weather, Sand Bay, Jan. 12 (R.A.). Chew Valley res. : one, Mar. 10 ; two on 24th (J.R.B., C.L.) ; up to four, Sept. 29–Dec. 26 (many observers).

WOODCOCK *Scolopax rusticola*

G. Single bird, New Grounds, Mar. 6 (M.A.O.).

S. Records, Jan. – Feb., from Sand Point, Chew Valley res., Newton St. Loe, Barrow Gurney, Freshford, Chilcompton and Midsomer Norton. One on tide line in hard weather, Sand Bay, Jan. 20 (H.A.T.) ; dead bird, Steep Holm, Apr. 28 (Res. Stn.). Single birds, Shipham, May 12, Dec. 14 (T.B.S.) ; Lansdown, Oct. 26, and St. Catherine's Valley, Nov. 13 (R.J.L.). Three, Kilmersdon, Dec. 14 (E.G.H.).

CURLEW *Numenius arquata*

G. Max. counts, New Grounds : 225, July 2, and 320 on 18th ; 150, Sept. 5 (L.P.A.).

S. Pair, Walton Moor, Apr. 12 (P.G.H.) ; 200, Yeo Estuary, July 21 (T.B.S.) and 200 or more, Axe Estuary, Nov. 23 (K.A.F.).

WHIMBREL *Numenius phaeopus*

S. Inland records : parties totalling 57, Kenn Moor, May 11 (H.R.H., S.M.T.) ; ten, Stoke Moor, nr. Cheddar on 12th (T.B.S.); seven, Chew Valley res., July 24 (B.K., N.R.W.) and five, Aug. 10 (M.K.).

BLACK-TAILED GODWIT *Limosa limosa*

G. New Grounds : one, Mar. 17 ; two, Apr. 8 ; one, June 14, 16 ; 25 on July 18, and sixteen, Aug. 3 (L.P.A.).

S. Chew Valley res. : eight, Apr. 14 (M.A.W.) ; up to five, Aug. 2 – Sept. 8 (various observers) ; two, Nov. 10 (W.J.S.) ; one on 16th (R.A.). Two, Yeo Estuary, Aug. 2 (T.B.S.).

BAR-TAILED GODWIT *Limosa lapponica*

G. New Grounds : ten, June 2 ; 30, Sept. 4 ; 42 on 15th ; four, Oct. 13 (L.P.A.).

S. Weston Bay – Sand Bay : two, Jan. 13 ; five, Feb. 9 (R.A.) ; two, May 4 (T.B.S.) ; 48, Sept. 19 ; twelve, Oct. 6 (R.A.) and single birds, Oct. 12 (R.M.C.), Nov. 24 (R.A.). Three, mouth R. Avon, Sept. 15 (K.B.Y.). Chew Valley res. : one, Aug. 18 – Sept. 1 (various observers) ; nine, Sept. 4 (D.W.) ; two, Oct. 12 (K.L.F.), Dec. 12 (D.W.).

GREEN SANDPIPER *Tringa ochropus*

G. One disturbed from river bank, Oldbury Court, nr. Frenchay, Jan. 3 (R.H.P.). Max., New Grounds—nine, July 29 (L.P.A.).

S. Barrow Gurney resrs. : single birds, Jan. 6 (P.J.C.), Mar. 4, 6, 7 (T.B.S.). Chew Valley res. : one, sometimes two, mid-Feb. to late Mar. (various observers) ; twelve, July 24 (B.K.) ; up to 20 or more, Aug. ; three or four, Sept. (many observers) ; two, Oct. 23 (E.M.P.) and Nov. 9 (C.L.). Single birds, Tickenham, Feb. 3 (T.R.J.W.) and Dec. 8, 28 (H.R.H.). Two, St. George's Wharf, June 15 (K.L.F.) and one, July 18 (J.F.B., M.K.). Single bird, Yatton, Oct. 17 (H.H.D.).

WOOD SANDPIPER *Tringa glareola*

G. Two, New Grounds, June 28 – July 2, and Aug. 7 – 13 (L.P.A.).

S. Chew Valley res. : single birds, Apr. 28 ; June 26 (J.R.B.) ; July 21 (R.S.H., W.J.S.), 28 (R.J.P.) ; up to six, mid-August (R.S.H., J.A.McG. *et al.*) ; two, Sept. 5–12 (R.M.C., K.L.F. *et al.*).

COMMON SANDPIPER *Tringa hypoleucos*

G. and **S.** One, R. Avon, Hanham, Apr. 22 ; May 30 ; Sept. 4 (A.H.D.), and Cumberland Basin, Aug. 4 (G.S.). 29 (max. spring total), Cheddar res., May 5 (J.A.McG.). Ten, Litton res., July 7 (B.K., R.J.P.).

REDSHANK *Tringa totanus*

S. No breeding records. Fifteen, Chew Valley res., May 4 (K.L.F.). Coastal flocks smaller than usual : max., 122, Weston Bay, Feb. 25 (W.L.R.) ; 84, Woodspring Bay, Sept. 14 (T.B S.).

SPOTTED REDSHANK *Tringa erythropus*

G. Max. counts, New Grounds : 24, Sept. 1 ; twenty, Oct. 13 (L.P.A.).

S. Chew Valley res. : one in full summer plumage, Apr. 27 – May 11 (R.M.C., H.H.D., B.K. *et al.*) ; up to six, July 24 – Sept. 3 (many observers) ; fifteen, Sept. 8 (K.L.F. *et al.*) ; twelve, Oct. 6 (W.J.S.); two, Nov. 3 (P.J.C., M.A.W.), and on 9th (C.L.). Blagdon res. : one, Oct. 6 (P.J.C.) ; three on 12th (R.M.C.). Single bird, Weston Bay, Sept. 1 (R.A.). Two, Sand Bay, Sept. 7, and one, Yeo Estuary, Oct. 20 (T.B.S.).

GREENSHANK *Tringa nebularia*

G. New Grounds : three, July – Aug. ; seven, Sept. 12 ; eleven on 17th (L.P.A.).

S. Chew Valley res. : single birds, Apr. – May (B.R., M.W.S., R.J.S. *et al.*) ; two, June 9 ; 29 (exceptional count), July 31 (B.K.); up to fifteen in August (many observers) ; eighteen, Sept. 8 ; three, Oct. 6 (W.J.S.), 13 (B.K., B.R.) ; single birds, Nov. 3, 9, 10 (R.J.P. *et al.*). Two, Blagdon res., Sept. 15 ; one on 21st (R.B., M.K.). Single birds, Barrow Gurney resrs., Aug. 29, Sept. 4, 11 (T.B.S.). One, R. Yeo, Yatton, Nov. 4 (H.H.D.).

KNOT *Calidris canutus*

G. New Grounds : fourteen, May 28 ; 27, Aug. 21 ; 90, Sept. 2, and 40 on 8th (L.P.A.).

S. About 5,000, Weston Bay, Jan. 6, and similar number, or more, Dec. 28 (R.A.). Single birds, Chew Valley res., Aug. 11 (W.J.S.), 24 (H.A.L.). Fourteen over Barrow Gurney resrs., Sept. 6 (T.B.S.).

PURPLE SANDPIPER *Calidris maritima*

G. Three, Severn Beach, Nov. 24 (H.W.N., J.F.R.).

S. Two on rocks, Brean Down, Dec. 1 (P.J.C., M.A.W.).

LITTLE STINT *Calidris minuta*

G. New Grounds : single birds, May 9 ; June 6, 12 ; Aug. 25 ; seven, Sept. 1 – 17 ; one, Nov. 3, 24 (L.P.A.).

S. Single birds, Chew Valley res., Aug. 31, Sept. 1, 2 (R.B., P.J.C., M.K. *et al.*) and two on 3rd (R.M.C., R.J.P.). One, Sand Bay, Sept. 18, and Weston Bay, Nov. 10 (R.A.).

TEMMINCK'S STINT *Calidris temminckii*

S. One seen and fully described, Chew Valley res., Aug. 10 (R.M.C.).

DUNLIN *Calidris alpina*

S. Dead bird, Kingston Seymour, Dec. 28, was found to have wing length of 121 mm.—a measurement falling within range quoted for northern race *C. a. alpina* (M.K.).

CURLEW SANDPIPER *Calidris testacea*

G. Exceptional numbers, New Grounds : eight, Aug. 31 ; up to 40, Sept. 1 – 6 ; eleven on 15th ; up to three to end of month and Oct. (L.P.A.).

S. Chew Valley res. : five, Aug. 31 (R.A., B.E.S.) ; six, Sept. 1, 2 (R.B., P.J.C., M.K., M.A.W.) ; eight on 3rd and 5th (R.M.C., G.S. *et al.*) and one on 9th (R.M.C.). Three, Sand Bay, Sept. 7 (T.B.S.) and one on 18th (R.A.) and 21st (T.B.S.).

SANDERLING *Crocethia alba*

G. New Grounds : several dates, May – Sept. ; max.—26, June 5, and 70, Sept. 1 (L.P.A.).

S. Few coastal records. Single bird, Weston Bay, Jan. 13 (R.A.) ; three, mouth R. Avon, Feb. 7 (K.B.Y.) ; up to eight, Sand Bay in May (R.A., T.B.S.). Single birds, Chew Valley res., May 11 (A.A.C., B.K., R.J.P.) and Cheddar res. on 18th (R.M.C.).

Ruff *Philomachus pugnax*

G. New Grounds : five or six, Apr. – May ; seven, Aug. 28 ; nine, Sept. 1 ; two, Sept. 18, Oct. 13 and one, Nov. 3 (L.P.A.).

S. Chew Valley res. : one, May 12 (R.J.P., B.R., T.B.S. *et al.*) ; up to ten, Aug. – Sept. (many observers) ; twelve, Oct. 27 (W.J.S.) ; three, Dec. 14 (R.M.C., R.J.P.) and one on 28th (J.R.B., C.L.). Two, Stoke Moor, nr. Cheddar, Aug. 4 (T.B.S.).

Red-necked Phalarope *Phalaropus lobatus*

G. Juvenile seen on water at very close range, New Grounds, Aug. 2, by L.P.A. who in a detailed description refers to the relatively long " needle-like " bill ; dark mantle (darker than in Green Sandpiper close by) with buff streaking ; pinkish tinge on breast and dark cap with white forehead, and dark streak behind and below eye. Second authentic record for Gloucestershire.

Arctic Skua *Stercorarius parasiticus*

G. Single dark phase bird, New Grounds, May 12 (L.P.A.).

S. One imm., dark phase, Chew Valley res., Sept. 19 (R.A.) ; one, dark phase, same place, Oct. 26 (B.K., R.J.P.). Single ads. off Steep Holm—dark phase, Aug. 26, and light phase on 27th (Res. Stn.) ; dark phase imm., 2 m. off Weston-s-Mare, Oct. 10 (H.H.D.).

Pomarine Skua *Stercorarius pomarinus*

S. Freshly dead 2nd summer imm. ♀, mouth of R. Kenn, nr. Clevedon, Nov. 17 (R.J.P.)—skin now in City Museum.

Great Black-backed Gull *Larus marinus*

S. Seventy-four nests reported (95 in 1962), Steep Holm (Res. Stn.).

Lesser Black-backed Gull *Larus fuscus graellsii*

S. Bred, Chew Valley res. ; up to three young, July 13, 14 (R.M.C., B.K.). Roost counts, same place, include : 800, Apr. 3 ; 585, Oct. 26 ; 450, Dec. 8 and 100 on 15th (B.K.).

Scandinavian Lesser Black-backed Gull *Larus fuscus fuscus*

S. One, viewed in good light, Chew Valley res., Apr. 6, had uniformly dark back and wings and was considered to be of this race (B.K.). Another, like miniature Great Black-backed Gull, Weston Bay, Nov. 28 (H.R.H.L.).

HERRING GULL *Larus argentatus*

S. Roost counts, Chew Valley res. : 450, Apr. 3 ; 235, Apr. 6; 350, May 16 ; 500, Dec. 8, and 400 on 15th (B.K., R.J.P.).

COMMON GULL *Larus canus*

S. Thirty, Chew Valley res., Feb. 9 ; 2,000, same place, Dec. 15 (B.K., R.J.P.). Coastal counts include : 400, Weston Bay, Jan. 5, and 300+, Dec. 27 (R.A.).

LITTLE GULL *Larus minutus*

S. First-winter bird, Blagdon res., Mar. 24, 30 (P.J.C., R.M.C., W.J.S.). Chew Valley res. : one imm., Apr. 29, and probably same bird, May 11, 12 (R.F.T. *et al.*) ; two, Aug. 30 (S.E.C.) ; one, Aug. 31, Sept. 1 (B.K., M.A.W., N.R.W. *et al.*).

BLACK-HEADED GULL *Larus ridibundus*

G. About 1,000, foraging on grass, Durdham Down, Dec. 13 (R.A.).

S. Roosting noted, Chew Valley res., Feb., Aug., Dec., with max. of 6,000, Dec. 15 (B.K., R.J.P.). Coastal counts include : 2,500, Weston Bay, Sept. 29, and 2,000, Dec. 15 (R.A.).

KITTIWAKE *Rissa tridactyla*

S. Immature, Weston Bay, May 11 ; one, imm., found dead, same place, Sept. 1 (R.A.). Imm. seen, Chew Valley res., Sept. 21 (B.K.) and another, dead on tide-line, Sand Bay, Sept. 22 (R.A.).

BLACK TERN *Chlidonias niger*

G. Single birds, New Grounds, Apr. 21, June 29 ; 28, Aug.29 and four, Aug. 31 (L.P.A., M.A.O.).

S. Spring passage at resrs. : one, Chew Valley, Apr. 20, 21 ; one, Barrow Gurney, Apr. 22 ; four, Chew Valley, Apr. 31 ; six, May 5, and 47, June 3 (P.J.C., B.K., M.A.W. *et al.*). Autumn passage, Chew Valley res. : 50, July 30 (R.J.P.) ; single birds, Aug. 11, 24 ; large passage, Aug. 30—*c.* 100 seen arriving and departing 0715–0730 hrs. G.M.T. (S.E.C.) with *c.* 200 present, late evening ; 200 early morning of 31st., with 125 in evening, but only fourteen, Sept. 1 ; up to 90, Sept. 2 ; smaller numbers (max. 14), Sept. 3 – 7 ; 40 on 8th and two on 10th (P.J.C., S.E.C., M.A.W. *et al.*). Blagdon res. : 25, Aug. 31 ; one, Sept. 14. Barrow Gurney resrs. : nil, Aug. 31 ; two, Sept. 12. Cheddar res. : three, Sept. 1, and one on 29th (B.E.S., T.B.S. *et al.*).

Common Tern *Sterna hirundo* Arctic Tern *Sterna macrura*

G. and **S.** Few noted, spring passage: single birds, New Grounds, June 6, 7; Cheddar res., Apr. 11, 21; Chew Valley res., Apr. 21, 28, May 23, 31. Autumn passage, resrs., July 13 – Nov. 12: of 27 records, seventeen refer to single birds, five of two, four of three and one of four. Single birds, Woodspring Bay, July 13, and R. Avon, Saltford, Aug. 25. Single *hirundo*, Cheddar res., Oct. 13, 26; Blagdon res., Oct. 27 (R.M.C., J.A.McG., R.J.P.); up to four *macrura*, Cheddar res., Apr. 21, Aug. 29, Sept. 1, and one, Blagdon, Oct. 6 (P.J.C., H.H., B.K., J.A.McG., M.A.W.).

Roseate Tern *Sterna dougallii*

S. One seen Weston Bay, June 29, flying S.W. over Brean Flats by R.A., who mentions very white underparts, pale grey upperparts, long tail-streamers, long dark bill and absence of crest. Fourth record for the county—cf. *Proc. B.N.S.*, 1962, p. 324.

Little Tern *Sterna albifrons*

S. One, Chew Valley res., Aug. 31 (R.A.).

Sandwich Tern *Sterna sandvicensis*

G. One imm., New Grounds, Sept. 11 (L.P.A.); details supplied.

Razorbill *Alca torda*

S. One found dead, Sand Bay, Oct. 13 (R.A.).

Little Auk *Plautus alle*

S. One, Cheddar res., Nov. 6, found dead on 7th (P.T.L.).

Stock Dove *Columba oenas*

G. Flock of five, Shirehampton, roosting with Woodpigeons and Collared Doves, Jan. – Feb. (C.L.); five, New Grounds, Nov. 30 (R.M.C.).

S. Reported from Radstock and Midsomer Norton, Jan. (C.S.). Winter flock, up to ten, Chew Valley res. (W.J.S.); two to six birds, same place, Mar. – Apr. (P.J.C., C.S., M.A.W.). Two, Steep Holm, Sept. 8 (Res. Stn.).

Turtle Dove *Streptopelia turtur*

G. Three, Avonmouth Dock, May – July; 21, July 13, and three as late as Oct. 28 (C.L.). Pair, Littleton-on-Severn, July 26 (P.J.C.).

S. Breeding season records from Banwell, Walton Moor, Tickenham, Portishead, Combe Down, Bath (P.G.H., E.G.M.N., W.L.R. *et al.*). Flocks of ten, Bath, and six, Litton, Aug. 11 ; eleven, Wrington, Sept. 1 (A.A.C., M.K., J.A.McG.).

COLLARED DOVE *Streptopelia decaocto*

G. Flock of fourteen, Shirehampton, Jan. – March, with four pairs present in breeding season ; one pair with three nests raised three young (C.L.). Other breeding records : two young reared, B.B.C. gardens, Clifton, and another two young reared elsewhere in Bristol (R.B.) ; pair reared single young, New Grounds, August—two other pairs present did not breed (M.A.O.). Up to three ads., Cornwallis Crescent, Clifton, Jan. – Feb., Apr. – May, August and Dec. (G.S.). One, Redland, Apr. – July ; two, July 13 (C.G.). Large numbers feeding on grain, Avonmouth Dock : 34, Apr. 6 ; 43, May 12 ; 40, June 21 ; *c.* 30, July 13, and 92, Oct. 28 (C.L.) and influx noted, New Grounds, Sept. – Oct., with max. of *c.* 20, Oct. to end year (M.A.O.).

S. One or two, Weston-s-Mare, Jan. – April, Oct. and Dec. ; four, Apr. 11 (R.A., R.B.). Single birds, Portishead, May 4 (G.E.C.); Odd Down, Bath, May 15 (R.M.C.) and Pill, July 26 (J.F.B.). Two, Failand, Sept. 23 (H.H.D.).

BARN OWL *Tyto alba*

S. The only records are of single birds, nr. Lower Weare, various dates, Mar. – May and three dates, Sept. (R.H.R.) ; Yatton, Apr. 1 (H.H.D.) ; Wrington, Oct. 13 (M.K.) ; Kingston Seymour, Nov. 3 (J.F.B.) and Bishop Sutton, Nov. 5, 22 (D.W.).

SHORT-EARED OWL *Asio flammeus*

S. One, Chew Valley res., Mar. 18 (R.F.T.).

NIGHTJAR *Caprimulgus europaeus*

S. Single ♂, Leigh Woods, May 19, 23, but not found, June 22 (R.F.T. *et al.*). One ♀, Shipham, May 20—" almost certainly does not breed here " (T.B.S.).

SWIFT *Apus apus*

G. and **S.** Early migrants, Apr. 23 – 25 ; 200, Chew Valley res., Apr. 27 (A.A.C.) ; 100, May 4, and *c.* 1,000, May 5, 13 (W.J.S., J.D.R.V.) with many thousands on windy days, May – July (R.F.T.). Main departure, Downend, Aug. 1 – 7 (R.H.P.) but resident birds still present, Clifton, Aug. 13, and *c.* 100, Sea Mills, same date (P.J.C.).

KINGFISHER *Alcedo atthis*

S. Single birds, nr. Bath, Litton and South Widcombe in breeding season (R.M.C., R.S.H., B.K. *et al.*). Up to three, Broomhill, Midsomer Norton, Radstock, Bath and Shockerwick, nr. Bath, Jan. – Feb.; one, nr. Yatton, Oct. 21, and Litton, Nov. 17 (J.F.R., W.L.R. *et al.*).

BEE-EATER *Merops apiaster*

S. Three, Weston Woods, Apr. 23, seen by R.A. who refers to long glides and flaps while circling over trees, short single 'croo' calls every few seconds and pale grey underparts. Record confirmed by *Brit. Birds* Rarities Committee.

HOOPOE *Upupa epops*

G. One, lower Wick, nr. North Nibley, May 12 (D.H. per T.P.W.).

GREEN WOODPECKER *Picus viridis*

S. Few records. Breeding season: Cheddar, Rowberrow, Shute Shelve, Cadbury Camp, Goblin Combe (probably bred) (C.G., R.H.R., G.S. *et al.*).

LESSER SPOTTED WOODPECKER *Dendrocopos minor*

G. One, Lyde Green, Dec. 15 (P.L.G.).

S. Single birds, Leigh Woods, May 14 (T.B.S.); Winscombe, July (D.G.) and Saltford sewage farm, Aug. 5 (G.S.).

WOODLARK *Lullula arborea*

S. One singing, Compton Martin, Apr. 15 (T.B.S.). One Barrow Gurney resrs., Oct. 13 (W.J.S.). Not noted, Mendip Hills, during year (R.S.H.).

SHORE LARK *Eremophila alpestris*

S. Single bird, Chew Valley res., Feb. 3 (P.J.C., R.M.C.), and various dates later in month (A.A.C., B.K., R.J.L., R.J.P. *et al.*); still there, Mar. 10 (P.J.C., M.A.W.). First record for N. Somerset.

SWALLOW *Hirundo rustica*

S. Entirely white bird reared with others of normal plumage, Hallatrow, late Aug. (M.S.M.). Roost, at least 500, at pond, Charterhouse, Mendip, Aug. 24 (T.B.S.). Late dates: Nov. 3, 4, Sand Point (R.A., T.B.S.). Young bird ringed (AH17545), Nailsea, 18/8/63, recovered, *c.* 5,000 m. S., Okigwi, Nigeria, 1/11/63 (H.R.H.).

SAND MARTIN *Riparia riparia*

G. New colony, five pairs, in retaining wall, Stapleton, May – June (H.G.H.).

S. Two pairs nesting in wall, Parson Street Station, Bedminster, May 16 (J.F.B.) and nesting again noted, R. Avon, Saltford, June (P.T.S.). About eight pairs in wall drains, Batheaston, June 26 (A.A.C.). Juv. ringed, Chew Valley res., Sept. 7, recovered Loire, France, 500 m. S.E. on 18th (M.R.G.).

GOLDEN ORIOLE *Oriolus oriolus*

S. A male, Leigh Woods, June 1, reported by P.J.C. who has supplied conclusive details of size, call notes and plumage. A male was seen by R.S.H., Chew Valley res., May 4, 1962 (*Rep. Somerset Birds*, 1962, p. 42).

RAVEN *Corvus corax*

S. Pair at usual breeding site, Brean Down, various dates, early Feb. to mid-May (R.A., W.L.R. *et al.*) ; second pair in the vicinity, Apr. 4 (R.J.P.). One, Steep Holm, June 4, and pair (perhaps from Brean Down) reaching or leaving island, several dates, Aug. – Oct. (Res. Stn.). Two over Cheddar Gorge, Sept. 14 (R.A.) and two, St. Catherine's Valley, Bath, on 30th (R.J.L.). One, Sand Point, Oct. 5 (T.B.S.), Nov. 10 (E.H.), and Blagdon, Nov. 10 (K.L.F.).

HOODED CROW *Corvus cornix*

G. One, with Carrion Crows, Hallen Marsh, Apr. 7 (A.H.D.).

GREAT TIT *Parus major*

S. Pair nested on ground beneath large up-turned flower pot, Clapton-in-Gordano (H.H.D.). Movement involving more than 50, with some Blue Tits, noted, Brean Down, Oct. 20, 22 by R.H.P. who records that the birds were apparently following the coast, some being deflected along the Down before orientating on a southerly course, and that eight caught in mist-net were all first-year birds.

WILLOW TIT *Parus atricapillus*

S. Pair seen frequently during breeding season, Abbots Pool (Abbots Leigh) and found nesting in hole in Scots Pine, May 13 (J.F.B., M.K.). First breeding record for N. Somerset.

DIPPER *Cinclus cinclus*

S. Single bird, Shockerwick (Bathford), various dates, Aug. to end Nov.; two there, Oct. 1 (A.A.C.). One, Midford Brook, nr. Bath, May 20 (P.H.) and two, Oct. 13, Dec. 1 (R.M.C.).

SONG THRUSH *Turdus philomelos*

G. Two ringed, Wick, 1/7/61, were both recovered, 115 m. S.W., Fowey, Cornwall, Jan.–Feb./63 (R.F.T.). Another ringed Wick, 23/6/62 recovered Gironde, France, 450 m. S, 15/1/63.

S. Pair, Nailsea, with five partially finished nests between consecutive rungs of horizontal ladder on inner wall of barn—centre nest being finally completed and young reared (H.R.H.).

REDWING *Turdus musicus*

G. and **S.** Large passage, with some Song Thrushes, over Bristol, 1900–2200 hrs., Jan. 3 (R.H.P.) and overhead, between Bristol and Wrington, on night of Oct. 23 - 24 (M.K.). Marked pre-dawn movement, with some Song Thrushes and Blackbirds, over Brean Down, Oct. 27, noted by R.H.P.—north side of Down holding numbers of each species at daybreak (50 Blackbirds seen—seven, all first-year birds, trapped).

RING OUZEL *Turdus torquatus*

S. One, Steep Holm, Sept. 21 (Res. Stn.). One, Brean Down, Sept. 22 (R.H.P.), Nov. 10 (R.A., T.R.J.W.).

WHEATEAR *Oenanthe oenanthe*

S. Breeding, one or more pairs, noted nr. Compton Bishop, June - July (S.I.B., T.B.S.). Juvenile, Charterhouse, Mendip, July 30 (T.B.S.).

STONECHAT *Saxicola torquata*

S. Scarce in usual coastal haunts after the prolonged frost—the only spring records being of two or three, Sand Point, Mar. 10 (R.A., T.B.S.) and one, Brean Down, several dates, Mar. - Apr. (E.G.H., R.H.P. *et al.*). No reports of breeding. More frequent in autumn when up to seven, Brean Down, and up to three, Sand Point, various dates, Oct. - Dec. (P.J.C., M.A.W., T.R.J.W. *et al.*). A male, Goblin Combe, Cleeve, Dec. 22 (M.K.).

WHINCHAT *Saxicola rubetra*

S. Breeding or breeding season records from Chew Valley res., Nailsea Moor, and Walton-in-Gordano (many observers). Sept. records from Brean Down, Clevedon saltings and elsewhere (H.A.L., B.E.S. *et al.*).

BLACK REDSTART *Phoenicurus ochrurus*

G. Male, Chittening, nr. Avonmouth, Feb. 6 (H.A.T.).

S. Two, Brean Down, Oct. 20, and one, several dates, Dec. (R.F., B.E.S. *et al.*). Single birds, Long Ashton (male), Oct. 23 (M.A.W.), and Clevedon, Dec. 30 (R.J.S.).

GRASSHOPPER WARBLER *Locustella naevia*

G. One (or two) seen and heard, St. George, Bristol, as early as Apr. 16 ; still present on 22nd (A.H.D.).

S. Seen or heard, Brean Down, late Apr. – early May (R.A., E.M.P. *et al.*) and breeding season records from Leigh Woods (nest and eggs) (P.J.C.), Shipham (T.B.S.), Burrington Combe (R.S.H.) and Walton Moor (P.G.H.). One, Steep Holm, Sept. 25—first record for the island (Res. Stn.).

REED WARBLER *Acrocephalus scirpaceus*

S. One trapped, Steep Holm, Sept. 22—first record for the island (Res. Stn.).

AQUATIC WARBLER *Acrocephalus paludicola*

S. One seen and heard in low hedge, Blagdon res., May 13 (G.S., M.A.W.) ; necessary details of song and plumage supplied and record (first for N. Somerset) accepted by *Brit. Birds* Rarities Committee.

BLACKCAP *Sylvia atricapilla*

G. and **S.** Male in garden, Redland, Bristol, Jan. 11 – 19 (W.W.) and another at bird table, Winscombe, various dates, Jan. – Mar. (T.B.S.). Male and female (perhaps wintering), Saltford, Mar. 4 – 7 (P.T.S.).

CHIFFCHAFF *Phylloscopus collybita*

G. and **S.** One in sustained song, Stapleton, Bristol, as late as Oct. 20 (H.G.H.). Winter record of one, Weston-s-Mare, Dec. 8 (R.A.).

WOOD WARBLER *Phylloscopus sibilatrix*

G. Two singing, Westonbirt Arboretum, early June (H.H.D.).

S. Reported, May – July, from Leigh Woods (G.S., P.T.S.), Weston-s-Mare (R.A.), Downside (R.S.H.) and Whitchurch (R.J.S.).

PIED FLYCATCHER *Muscicapa hypoleuca*

G. Female in garden, Stoke Bishop, Bristol, May 5 (J.C.G., G.W.J.). Female or imm., Filton, Aug. 23 (R.A.).

S. Male in garden, Flax Bourton, Apr. 12 – 15 (A.E.R.). Imm. bird, Westpark Wood, Clapton-in-Gordano, Sept. 15 (H.H.D.).

TREE PIPIT *Anthus trivialis*

G. Three singing, Michael Wood, Tortworth, May 26 (A.P.R.).

S. May – June records from Leigh Woods, Failand, Combe Down (nr. Bath), Brockley Combe, Chew Valley res., Charterhouse and Yoxter (Mendip), Compton Martin and Christon Plantation.

ROCK PIPIT *Anthus spinoletta petrosus*

S. Reservoirs : one, Barrow Gurney, Jan. 20, and Blagdon, Feb. 17 (P.J.C.).

WATER PIPIT *Anthus spinoletta spinoletta*

S. One, Saltford Sewage Farm, Feb. 9 (R.M.C.) and Blagdon res., Mar. 12 (R.S.H.). One, or two, Chew Valley res., Oct. 13, and three, Nov. 10 (R.S.H.).

GREY WAGTAIL *Motacilla cinerea*

G. Pair, R. Frome, Stapleton, using same nest site for seventh successive year (H.G.H.).

S. Most reports for period Sept. – Dec., but breeding season records from Chewton Mendip, Cheddar (village) and Litton reservoir.

YELLOW WAGTAIL *Motacilla flava flavissima*

S. At least seventeen pairs, Chew Valley res., May 11 (B.K.). Eight pairs, Nailsea Moor and three, Kenn Moor, Apr. – July (H.R.H., S.M.T.). Other breeding season records from Cheddar (R.M.C.) ; Puxton Moor, Stoke Moor, Blagdon res., Barrow Gurney (T.B.S.) and St. George's Wharf, Portbury (K.B.Y.).

BLUE-HEADED WAGTAIL *Motacilla flava flava*

S. A *flava* wagtail, with blue-grey head and conspicuously white eyestripe and throat, seen at close range, Chew Valley res., May 1, was considered to be a bird of this race—probably a female (B.K., C.S.).

WAXWING *Bombycilla garrulus*

S. One feeding on hawthorn berries, Nyland, Cheddar, Dec. 3 (J.S.).

GREAT GREY SHRIKE *Lanius excubitor*

S. One, Lansdown, Bath, Oct. 18, 1962 (*Rep. Somerset Birds*, 1962, p. 49).

RED-BACKED SHRIKE *Lanius collurio*

G. Male, Horseshoe Bend, Shirehampton, May 31; not seen later (P.G.H.).

STARLING *Sturnus vulgaris*

G. Counts (approx.) at bridge roost, Cattle Market Road, Temple Meads: 15,000, late Jan., and 23,000, mid–Mar.; half the total, mid–Apr. and over 9,000, early May (J.R.B., C.L. for B.T.O. Census). Up to *c.* 1,500 roosting beneath platform roof, Temple Meads Station, Jan. 19 to late Feb.; site still in use, Aug., but by Oct. apparently deserted (R.H.P.) (*W. D. Press*, 30/8/63). One ringed (35871R), Eastville, Bristol, 19/1/63, recovered, 1,000 m. N.E., nr. Kaliningrad, U.S.S.R., 18/3/63 (M.J.B.). One caught, Clifton, 20/1/63 had been ringed (45406S), Ossett, Yorks, 160 m. N.E., 18/6/61 (P.J.C.).

S. Roost, *c.* 4,000, in reeds, Chew Valley res., early May; at least 10,000 (mostly young), same roost, mid–June and perhaps twice the number, late Aug. (B.K., R.J.P.). One ringed (X33517), Corston, 14/2/60, recovered, 125 m. N.E., Bourne, Lincs., 1/2/63 and one ringed (34164X), Saltford, 13/8/61, recovered, 50 m. S.S.E. Poole, Dorset, 10/12/63. (P.J.C.).

HAWFINCH *Coccothraustes coccothraustes*

S. Single birds, Leigh Woods, Mar. 31, and Widcombe, nr. Bath, Oct. 16 (R.M.C.). Two in woodland, Failand, Nov. 30 (G.A.B., M.E.B.).

SISKIN *Carduelis spinus*

G. and **S.** Three, New Grounds, Jan. 19, and one, Oct. 17 (L.P.A.). Party of nine, Sand Bay, Jan. 27, and single birds, several dates, Nov. – Dec. (R.A.). Two, Shipham, Oct. 12, and one, Wick St. Lawrence, on 27th (T.B.S.).

LESSER REDPOLL *Carduelis flammea cabaret*

G. New Grounds: one, Apr. 19; others, Oct. – Nov. with max. of twelve, Nov. 2 (L.P.A.).

S. Single birds, Clapton-in-Gordano, Jan. 7 (H.H.D.) and Victoria Park, Bath on 26th (R.J.L.). Two, Batheaston, Feb. 3 (A.A.C.). Up to six, Sept. – Nov., Leigh Woods (J.F.B., M.K.), Blagdon and Kingston Seymour (M.K.).

Mealy Redpoll *Carduelis flammea flammea*

S. Of two Redpolls (" noticeably greyish and whitish ") at Saltford Sewage Farm, Feb. 10, 1962, one was caught and proved, by plumage details and overall measurements (wing : 77 mm.), to be a Mealy Redpoll (R.F.T.).

Crossbill *Loxia curvirostra*

G. Single female, Filton, Oct. 23 (R.A.).

S. Twelve or more, Tickenham, Jan. 8 (L.M. per J.B.). Parties of up to seven or eight, various dates, Aug. – Dec. : Ashton Park (J.F.B.), Clapton-in-Gordano (H.H.D.), Failand (P.J.C., C.G.), Wraxall (H.H.D., M.A.W.), Wrington (M.K.) and Shipham (T.B.S.). Blagdon res. plantations : frequently, mid–Nov. to end of year with max. party of 30, first half of Dec. (various observers).

Corn Bunting *Emberiza calandra*

G. One on Cotswolds, Old Sodbury, Aug. 16 (H.H.D.).

S. Mid–winter record of one, Barrow Gurney, Jan. 20 (P.J.C.). Three singing, Saltford, June 2 (B.K.). Single bird records, May – Oct., from Odd Down and Charmy Down (Bath), and Yoxter (Mendip) (R.J.L., T.B.S. *et al.*). Three singing, Lansdown, Bath, Aug. 2 (J.H.).

Cirl Bunting *Emberiza cirlus*

G. and **S.** Breeding season records from half a dozen localities. Party of ten, Cheddar, Nov. 24 (R.H.R.).

Snow Bunting *Plectrophenax nivalis*

G. and **S.** Single birds, New Grounds, Sept. 20 (L.P.A.) and Brean Down, Nov. 3 (J.A.McG.).

Tree Sparrow *Passer montanus*

G. and **S.** Winter parties reported from widely separated localities (R.M.C., P.L.G. *et al.*) Breeding season records from Chew Valley res., Nailsea Moor, Stoke Moor, Loxton and Weston-in-Gordano (J.A.McG., S.M.T. *et al.*).

Species reported but not included in the Systematic List :—

Residents : Little Grebe, Cormorant, Mute Swan, Partridge, Moorhen, Little Owl, Tawny Owl, Great Spotted Woodpecker, Skylark, Carrion Crow, Magpie, Jay, Blue Tit, Coal Tit, Marsh Tit, Long-tailed Tit, Nuthatch, Tree-creeper, Wren, Mistle Thrush, Blackbird, Robin, Goldcrest, Hedge Sparrow, Meadow Pipit, Pied Wagtail, Greenfinch, Goldfinch, Linnet, Chaffinch, Yellow Bunting, Reed Bunting, House Sparrow.

Summer or Winter Visitors and Passage Migrants: Cuckoo, House Martin, Fieldfare, Redstart, Nightingale, Sedge Warbler, Garden Warbler, Whitethroat, Lesser Whitethroat, Willow Warbler, Spotted Flycatcher, White Wagtail, Brambling.

EFFECTS OF THE SEVERE WINTER 1962-63

By G. Sweet

THE exceptional character of the winter of 1962-63 forms the background of this summary of the effects of the weather on certain species of birds. In North Somerset there were forty-five consecutive days of snow-cover, the longest, according to local records, since 1860, and the winter as a whole, at least in Central England, was the coldest since 1740.

The very cold weather began on Dec. 22, 1962, and continued throughout January and February 1963. During January the weather pattern was mainly anticyclonic and therefore very dry, except for heavy snowfalls in the first ten days with drifting produced by a fresh to strong easterly air-stream. Much of the county was snow-covered throughout the month although the soil beneath did not freeze ; reservoirs became frozen over and shores were strewn with pack-ice. February continued very cold with much snow, and winds remained predominantly easterly ; slightly higher temperatures with alternate periods of snow and rain during the second week cleared much of the snow-cover, but further cold weather with night frosts for the first time caused freezing of the ground from which snow had thawed. The remaining snow was not finally dispersed until the last week of the month.

Not unexpectedly the smaller passerines suffered most and detailed records of the Skylark in the Bristol area from January to mid-February refer to birds in weak condition searching for food on roads and along the river bank from Pill to the mouth of the Avon. Birds fed in gardens at Wells from mid-January to early February and two at Hutton were beneath a bird-table. Parties reappeared in mid-February ; in April one pair was seen at Chew Valley reservoir and even by May 11 there were only two pairs.

Tits, except for the Long-tailed Tit, seem to have suffered less. In one closely watched area, Blue Tits occupying nest-boxes were down to two pairs instead of the usual four or five ; they were fewer during the summer but by autumn were fairly normal. The Long-tailed Tit suffered some reduction although later in the year feeding-parties were recorded in North Somerset. A decrease in the Treecreeper was noted at the New Grounds, the Chew Valley area and Barrow Gurney ; it was, however, reported from widespread localities and at least in the Stapleton area numbers were maintained throughout the year.

All observers refer to the absence of the Wren from many localities after the severe weather. There is evidence of a slight recovery by the end of the year. On Steep Holm in 1962 there were 15–20 pairs, whereas in 1963 the maximum was five singing males and only one breeding pair.

The Song Thrush was very badly hit. Of three birds ringed at Wick, near Bristol, one was recovered at Taussat in the Gironde, on Jan. 15, and two at Fowey, Cornwall, at about the same period ; these are instances of weather movements due almost certainly to the severe winter. Large southerly movements of Fieldfares and Redwings occurred during early January and many Redwings were found dying when the hawthorn crop was exhausted.

Stonechats disappeared from Brean Down and Sand Bay after the cold spell ; a few birds were seen there in mid-March, were absent in the breeding season and did not occur again until late autumn.

Goldcrests were present throughout the year with no great reduction at Barrow Gurney plantations and fourteen were seen at Chew on April 27. At Cadbury Camp ridge, however, the species was not noticed again after the cold spell until early 1964. The Hedge Sparrow, on the other hand, seems to have been little influenced and a possible 10% increase in the breeding population is recorded from Downend and Steep Holm.

Both Meadow Pipits and Rock Pipits were scarce in spring and autumn and no large flocks of the former were seen at Chew Valley ; there were no large roosts in the reed beds at the same place in autumn of either Pied or Yellow Wagtails.

Greenfinches were considerably less frequent than in previous years on Steep Holm and it is suggested that elsewhere the post-breeding population was lower than in 1962. The species seemed, however, to maintain its numbers better in Clifton. No large Goldfinch flocks were seen in autumn at Chew and there were fewer on autumn passage at Steep Holm.

In January, parties of 25 or more Reed Buntings were seen at the mouth of the Avon feeding apparently on seeds of Cordgrass ; birds examined in the hand were in a very weak condition and unlikely to survive ; others at Shirehampton were feeding on bread and grain, sometimes with House Sparrows. The species disappeared from Nailsea and Kenn moors during the winter; in spring 1962 nine pairs were estimated to be breeding there but only two pairs in 1963. At Chew in mid-May there were four or five pairs but on June 25 thirteen singing males were recorded.

Many Woodpigeons died from starvation and shooting in or near the City up to the first week of February. No large flocks were seen at Shirehampton after Feb. 26 until the following December.

The Kingfisher appears to have been much reduced in North Somerset and the Green Woodpecker was scarcer than usual.

The freezing of the reservoirs caused the majority of wildfowl and water-birds to leave these areas in mid-January (early January saw exceptional numbers of Goosander and Smew at Chew Valley); there were few Teal, Wigeon or Tufted Duck until early February and Shoveler as well as Pochard congregated at Cheddar where Grey Lag, White-fronted and Canada Geese were present just before the thaw. Whitefront numbers at New Grounds dropped steeply in early January, but rose after the thaw in early February.

Coot sought ice-free waters including the Avon at Bath and at Bristol right up to the centre of the City; there was visible mortality among this species and the Moorhen. At Chew, Water Rails were not recorded after April until August; Herons showed a decline in occupied nests with only 26 in North Somerset, the lowest since 1951; and the breeding population of Shelduck was reduced.

Of Waders present on unfrozen ground, Woodcock were seen more frequently than usual, as birds moved in search of food in daytime. Lapwing numbers were small until the beginning of March when large northerly and easterly return movements occurred; post-breeding flocks of Curlew and Redshanks were down. Pairs of Great Black-backed Gull on Steep Holm fell from 86 (1962) to 74, possibly due to the prolonged winter.

Starlings began to roost under cover at Temple Meads station on Jan. 19 and continued to do so until steps were taken to disturb them in September. Bathing by this species when the temperature was well below freezing was observed on three dates in January, when four were found dead with frozen plumage and many were unable to fly; the observer comments that he did not notice the bathing of other species during the cold spell.

House Sparrows burrowed through snow on gutters to reach the entrances to roosting holes after heavy snowfalls on Jan. 3; further overnight falls and freezing of the snow along gutters could well have trapped birds roosting in roofs.

LEPIDOPTERA NOTES BRISTOL DISTRICT, 1963

MOTHS

By C. S. H. Blathwayt

A VERY cold Winter was followed by a late Spring and a poor Summer with only a few short periods of fine weather. It was not a good year for moths and few interesting migrants were seen. The following notes are taken from records supplied by J. F. Burton (J.F.B.), D. G. Gibb (D.G.G.), K. H. Poole (K.H.P.) and also from my own records (no initials).

Acherontia atropos Linn. (Deaths-head Hawk). One found at Clifton Heights, Bristol, in the Autumn (*per* P. Bird) ; also one at Pill, Oct. 18 (J.F.B.).

Trichiura crataegi Linn. (Pale Eggar). One at light, Almondsbury, Sept. 14 (D.G.G.). About eight males at light, Wickwar, Sept. 17 (K.H.P.).

Lithosia quadra Linn. (Large Footman). One at light, Weston, Aug. 2.

Apatele alni Linn. (Alder Dagger). Three at light, Almondsbury, in early June (D.G.G.).

Ammogrotis lucernea Linn. (Northern Rustic). One at light, Weston, Aug. 2.

Apamea furva Hübn. (Confused Brindle). One at light, Weston, July 27.

Antitype chi Linn. (Grey Chi). One at light, Almondsbury, Aug. 8 (D.G.G.). Common on stone walls, Cheddar, Sept. 4.

Chilodes maritima Tausch. (Silky Wainscot). One at light, Milton, Aug. 8 (K.H.P.).

Cosmia pyralina View. (Lunar-spotted Pinion). One at light, Weston, July 26.

Sterrha dilutaria Hübn. (Silky Wave.) Several, Clifton Downs, July 6 (K.H.P.).

Sterrha trigeminata Haw. (Treble-spot Wave). Common at light, Weston, in June.

Rhodometra sacraria Linn. (Vestal). One at light, Milton, Oct. 23 (K.H.P.) ; another at light, Weston, Oct. 24.

Discoloxia blomeri Curt. (Blomer's Rivulet). One at light, Milton, June 6 (K.H.P.); several at light, Weston, in June and July.

Selenia lunaria Schiff. (Lunar Thorn). Two at light, Almondsbury, May 31 and June 6 (D.G.G.).

BUTTERFLIES

By J. F. Burton

THE decision last year to publish all records of butterflies received, so as to obtain a clearer picture of the true status of all species at a time when many are apparently seriously declining in Britain, has produced a heartening response from local naturalists. Records were received from 18 contributors compared with 4 in

1962. This increase has made it possible to present a much fuller and therefore more valuable report. The area covered by this report consists of S. Gloucestershire as far north as Dursley and Tetbury and Somerset north of the River Brue.

Information received so far is not complete enough to draw any valid conclusions, but the populations of most resident species seem very low, with the exception of the Marbled White, which appears to be extending its range. As compared with the situation 10 years ago (Turner, 1955), the Wall Brown, the Ringlet, Pearl-bordered Fritillary, Silver-washed Fritillary, Small Tortoiseshell, Brown Argus, Common Blue, Small Copper, Green-veined White, Brimstone and Large Skipper seem especially scarce. The migrant species continue to be very few in numbers, apart from the Large and Small Whites. No Clouded Yellows were reported at all.

All records received for 1963 are given, except when summarized (Meadow Brown, Small Tortoiseshell, Common Blue, and Large and Small Whites). Contributors were: R. Angles (R.A.), C. S. H. Blathwayt (C.S.H.B.), R. Brock (R.B.), J. F. Burton (J.F.B.), P. J. Chadwick (P.J.C.), E. Clay (E.C.), H. H. Davis (H.H.D.), R. Frankum (R.F.), R. Henderson (R.H.), Miss L. E. Hurrell (L.E.H.), M. Kendall (M.K.), A. C. Leach (A.C.L.), K. H. Poole (K.H.P.), Steep Holm Gull Research Station (S.H. Res.Stn.), Dr. D. A. Stopher (D.A.S.), Mrs. E. Watt (E.W.), J. R. J. Williams (J.R.J.W.) and M. A. Wright (M.A.W.). **G** refers to Gloucestershire, **S** to Somerset. All notes are of adult insects, unless otherwise stated.

Pararge aegeria Linn. (Speckled Wood)

After the long and severe winter, the first *aegeria* did not appear until early May, several being noted in Leigh Woods and one at Sand Point on May 5. In the last report (Blathwayt & Burton, 1963), I referred to a suggestion by M. J. Goddard (1962) that the second generation of the second brood failed to appear in 1962 in Surrey and may have overwintered. I therefore suggested that it would be interesting to see if the spring brood of this species was unusually common in 1963. Very few spring records were received and records for June and July were also extremely few. It would appear that the first brood was generally scarce, the first generation of the brood appearing at the beginning of May and the second in late June or early July. The second brood was much more numerous, the first generation appearing at the beginning of August and the second generation in early September. This last generation extended to late October. The detailed records are as follows :—

G. and **S.** Not very common in the Bristol area (D.A.S.).
G. Clifton Downs: 6, Aug. 20 (J.F.B.); Filton: one, Aug. 20, Aug. 27 and Sept. 9 (R.A.); Tockington: a few on June 1 (D.A.S.).
S. Present in various localities in N. Somerset, particularly Weston Woods, from early May until late Oct. Never very common (C.S.H.B.); Leigh Woods: 9–12 on May 5 (R.B.); Abbots Leigh: one fresh imago, Aug. 12, 20–30 (mostly worn) on Aug. 29; Failand: one, Sept. 20; Pill: 5 fresh imagines on Aug. 5, 2, Aug. 10, *c.* 4, Sept. 9 (J.F.B.); Clapton-in-Gordano:

abundant in Westpark Wood, last noticed Sept. 22 (H.H.D.); Tickenham: not uncommon (J.R.J.W.); Goblin Combe: several, June 9 (D.A.S.); Churchill district: first one, May 5, several others on various dates, mainly Sept. (E.W.); Blagdon Lake: 68 on Sept. 14, 6 on Sept. 21 (M.K.); Weston-super-Mare: one, Sept. 13; Ashcombe Park, Weston: one, Oct. 6; Weston Woods: *c.* 6 in one hour on July 13, *c.* 5 in one hour, Aug. 19 (K.H.P.); Sand Point: one, May 5 and Oct. 13 (R.A.); Meare Heath: one, Sept. 14 (J.F.B.).

Pararge megera Linn. (Wall Brown)

G. Near Tockington: one, June 1 (D.A.S.).

S. Abbots Leigh: one, Aug. 13 and 29 (J.F.B.); Churchill district: 2 at Canada Combe, Aug. 17 (E.W.); Wemberham, nr. Yatton: 2, Aug. 28 (H.H.D.); Brean Down: one, July 20 and Aug. 18 (R.A.); Steep Holm: one, Aug. 27 (S.H. Res. Stn. *per* M.A.W.).

Eumenis semele Linn. (Grayling)

S. "About for a long time this year, namely from July until the end of Sept., and was fairly frequent at various places on the limestone in N. Somerset" (C.S.H.B.); Cadbury Camp: one, July 29 (E.C.); Churchill district: several, Aug. 8 (E.W.); nr. Charterhouse: a few, Aug. 5 (D.A.S.); Brean Down: 3, July 20 (R.A.), a few on July 28 (D.A.S.), common in August (J.R.J.W.).

Melanargia galathea Linn. (Marbled White)

This species does not seem to be sharing the low fortunes of most of our butterflies, and as C.S.H.B. remarks "it seems to be spreading to a number of places in N. Somerset where it did not previously occur".

G. Kingsweston Down, Bristol: fairly common, July 20 (D.A.S.); Wickwar: common, July 21 (D.A.S.).

S. Clapton-in-Gordano: one, Westpark Wood in late July (H.H.D.); Cadbury Camp: abundant, July 27–30 (E.C.); Chew Valley Lake: numerous on July 20 (P.J.C.); Wrington: *c.* 10 on July 29 along disused railway track (R.B.); Wemberham, nr. Yatton: one in late July (H.H.D.); nr. Charterhouse: abundant, Aug. 5 (D.A.S.); Berrow golf course: 2 on July 26 and 29 (E.W.); Brean Down: 2 on July 20, one on Aug. 6 (R.A.).

Maniola tithonus Linn. (Hedge Brown)

G. Fairly common around Bristol. Seen in July on Kingsweston Down and in the Avon Gorge (D.A.S.).

S. Pill: 2 males on Aug. 5 (J.F.B.); Clapton-in-Gordano: one in Westpark Wood on Sept. 22, a late date (H.H.D.).

Maniola jurtina Linn. (Meadow Brown)

G. and **S.** Records from 6 observers suggest that *jurtina* was generally common in the countryside around Bristol from early July to the end of Aug. Three observers either stated or implied that it was not as common as usual.

Coenonympha pamphilus Linn. (Small Heath)

G. Filton: one, Aug. 27 (R.A.); common near Tockington on June 1 and Wickwar on June 3 (D.A.S.).

S. Abbots Leigh and Pill: unusually scarce, a few records of odd individuals only (J.F.B.); Nailsea district: several noted (J.R.J.W.); Churchill district: fairly common, June to Aug. (E.W.); nr. Charterhouse: common on Aug. 5 (D.A.S.); Brean Down: the only species seen, June 15 (K.H.P.).

Aphantopus hyperanthus Linn. (Ringlet)

S. Clapton-in-Gordano: a few in Westpark Wood, July and Aug. (H.H.D.); Churchill district: only *c.* 4 seen in 1963 (E.W.).

Argynnis euphrosyne Linn. (Pearl-bordered Fritillary)

G. Wickwar: 2 on June 3 (D.A.S.).

Argynnis selene Schiff. (Small Pearl-bordered Fritillary)

S. Churchill district: 2, June 10, 3 on June 11 (E.W.); Burrington Combe: 6 seen in *c.* 15 minutes on June 22; nr. Charterhouse: common on June 22 (D.A.S.).

Argynnis aglaia Linn. (Dark-green Fritillary)

S. Cadbury Camp: 2, July 30 (E.C.); Goblin Combe: *c.* 15 at thistle flowers on July 27 (D.A.S.); Churchill district: *c.* 3 on Aug. 6 (E.W.); Charterhouse: common on Aug. 5 (D.A.S.); reported plentiful in a Mendip locality (R.H. *per* K.H.P.); nr. Axbridge: one, Aug. 11 (D.A.S.); Brean Down: 2 on July 20 and 27, *c.* 12 on July 28; one on Aug. 6 and 18 (R.A., D.A.S.); Sand Point: one, July 27 (R.A.).

Argynnis cydippe Linn. (High Brown Fritillary)

S. Goblin Combe: a few in company with *A. aglaia* at thistle flowers on July 21 (D.A.S.).

Argynnis paphia Linn. (Silver-washed Fritillary)

G. Wickwar: 3 on July 21 (D.A.S.).
S. Clapton-in-Gordano: single examples on several dates in Westpark Wood in August (H.H.D.).

Euphydryas aurinia Rott. (Marsh Fritillary)

G. Wickwar: fairly common on June 3 (D.A.S.).
S. Fairly common in usual localities in N. Somerset (C.S.H.B.); nr. Charterhouse: a few, rather worn, June 22 (D.A.S.).

Vanessa atalanta Linn. (Red Admiral)

This species was scarce in 1963, most of the records falling in Sept. and Oct. The earliest record was of one at Weston-super-Mare on Aug. 18 and the last, one at Sand Point on Nov. 3. No records were received from Gloucestershire.

S. Churchill district: 3 only, Sept. 9 (E.W.); Weston-super-Mare: one on Aug. 18 (K.H.P.), one, Oct. 26 (R.A.); Steep Holm: single examples reported each day from Aug. 27 to Oct. 4, except Sept. 27, when there were 4, and Oct. 2 when there were 3, and Sept. 7, 8 and 24, and Oct. 1, when there were no records (S.H. Res. Stn. *per* M.A.W.); Sand Point: one on Nov. 3 (R.A.).

Vanessa cardui Linn. (Painted Lady)

Again very scarce.

S. Abbots Leigh: one on *Buddleia* on Aug. 13; Pill: one, Sept 15 (J.F.B.); nr. Clapton-in-Gordano: one on *Buddleia* on Aug. 8 (D.A.S.); Wemberham, nr. Yatton: one, Aug. 14 (H.H.D.); Churchill district: one, Sept. 8 (E.W.); Weston-super-Mare: *c.* 3 on Sept. 1 (C.S.H.B.); Brean Down: one, Aug. 18 (R.A.); Steep Holm: one, Aug. 26 (S.H. Res. Stn. *per* M.A.W.); Shapwick Heath: one in April (A.C.L. *per* D.A.S.).

Aglais urticae Linn. (Small Tortoiseshell)

G. and **S.** Very scarce this spring and generally less numerous than usual, the bulk of the records referring to the autumn. The earliest report was of one on March 28 at Weston-super-Mare (K.H.P.) and the last one at Sand Point on Nov. 3 (R.A.). Maximum numbers reported were 24 at Steep Holm on Oct. 4 and *c.* 20 on Sept. 27 (S.H. Res. Stn. *per* M.A.W.). A dozen in one day were reported from Churchill on Oct. 1, 2, 7, 8 and 12 (E.W.); Abbots Leigh on Aug. 13 (J.F.B.); and Steep Holm on Oct. 20 (S.H. Res. Stn. *per* M.A.W.).

Nymphalis io Linn. (Peacock)

More frequent than last year, but still rather scarce.

G. Clifton Downs: one, Aug. 20 (J.F.B.); Kingsweston Down, Bristol: a few on Aug. 10 (D.A.S.); Filton: one, April 22 (R.A.).

S. Abbots Leigh: 2 on Aug. 13, one on Aug. 19, 26 and 27, 2 on Aug. 29 (J.F.B., M.K.); Pill: one on Aug. 10 and Sept. 8; Portishead: one, Sept. 11 (J.F.B.); Goblin Combe: one, June 9 (D.A.S.); Churchill district: one, June 21, one or two, Aug. 17, Sept. 12, 16 and 17 (E.W.); Axbridge: one or two, May 9; Cheddar: *c.* 5, Aug. 23 (K.H.P.); Steep Holm: one, Aug. 27, 2 on Sept. 8 (S.H. Res. Stn. *per* M.A.W.). J.R.J.W. remarks that he saw "a few" in N.W. Somerset during the year.

Polygonia c-album Linn. (Comma)

G. Sea Mills: 2 on Oct. 8; Stoke Bishop: a few in August; Wickwar: 2, July 21 (D.A.S.); Fishponds, Bristol : one on *Nov. 26* brought to L.E.H. (*per* D.A.S.); Hanham Lock: one, Aug 14 (R.B.).

S. Pill: one at cornflowers on July 13; Abbots Leigh: one, July 23 and Aug. 13 (J.F.B.); Nailsea: one, Oct. 3; Tickenham: one in early Aug. (J.R.J.W.); Blagdon: one, Oct. 13 (P.J.C.); Churchill district: none seen in spring (usually several), one, Oct. 12 (E.W.); Steep Holm: one, Sept. 27, 2 on Sept. 28 and 29, one, Oct. 3 and 4 (S.H. Res. Stn. *per* M.A.W.).

Limenitis camilla Linn. (White Admiral)

G. Wickwar: 4 on July 21 (D.A.S.).

Cupido minimus Fuessl. (Small Blue)

S. Near Uphill: common on June 9 (D.A.S.).

Aricia agestis Schiff. (Brown Argus)

G. Hanham: a few by R. Avon on June 4 (D.A.S.).

S. Clapton-in-Gordano: one fresh imago on Aug. 30 (H.H.D.); Churchill district: several on various dates in June (E.W.); nr. Axbridge: a few, Aug. 11 (D.A.S.).

Polyommatus icarus Rott. (Common Blue)

G. and **S.** Much scarcer than formerly, but reports from Filton, Hanham and Tockington (**G.**), Pill, Failand, Blagdon, Churchill district, Uphill, Weston-super-Mare, Brean Down, Sand Point, Street and Ashcott Heath (**S.**) show that it is still widely distributed in small numbers. Most records refer to June, Aug. and Sept., the earliest being for June 1 and the latest, Sept. 21.

Lysandra coridon Pod. (Chalkhill Blue)

S. "Fairly common in their usual localities in N. Somerset at the usual time" (C.S.H.B.); plentiful in a Mendip locality (R.H. *per* K.H.P.); Draycott: fairly common, July 28 and Aug. 5 (D.A.S.).

Lysandra bellargus Rott. (Adonis Blue)

G. Filton: one on June 17 (R.A.)

Celastrina argiolus Linn. (Holly Blue)

G. Durdham Down: one or two in Aug. (D.A.S.).

S. Winscombe: one on Aug. 11 (D.A.S.).

Lycaena phlaeas Linn. (Small Copper)

G. Filton: one, Aug 26 (R.A.).

S. Pill: one fresh imago on Aug. 5, one on Sept. 8 (J.F.B.); noted at Tickenham and Nailsea Moor (J.R.J.W.); Churchill district: scarce, one on Aug. 1, 3 on Sept. 12 (E.W.); Shapwick Heath: 2, Sept. 14 (J.F.B., M.K.); Sand Point: one, Nov. 3 (R.A.).

Callophrys rubi Linn. (Green Hairstreak)

G. Wickwar: 2 on June 3 (D.A.S.).
S. Churchill district: not common, *c.* 3 on May 25 and June 11 (E.W.).

Thecla betulae Linn. (Brown Hairstreak)

S. Walton Hill, Street: larvae plentiful on blackthorn, June 5 (also in 1962) (K.H.P.).

Thecla quercus Linn. (Purple Hairstreak)

S. Walton Hill, Street: a few full-grown larvae on oak, June 5 (K.H.P.).

Pieris brassicae Linn. (Large White)

G. and **S.** Records suggest that only the second brood was fairly common, although J.F.B. considered the first brood almost as common as the second at Abbots Leigh and Pill, **S.**

Pieris rapae Linn. (Small White)

G. and **S.** First seen, April 16 (Weston-super-Mare); last record, Oct. 23 (Churchill). The second brood was common generally, the first brood much less so.

Pieris napi Linn. (Green-veined White)

Appears to be rather scarce, but probably much overlooked.

G. No records received.
S. Abbots Leigh: one on July 22, Aug. 12 and 29 (very worn); Pill: one, Apr. 26, frequent on May 12, several on May 25, a few on Aug. 5 and 17 (J.F.B.); Clapton-in-Gordano: frequent in Westpark Wood (H.H.D.); Churchill district: one on May 15, 2 on May 17 and odd ones at intervals later (E.W.); Steep Holm: one, Aug. 27 (S.H. Res. Stn. *per* M.A.W.); Ashcott Heath: one, Sept. 14 (J.F.B.).

Anthocharis cardamines Linn. (Orange-tip)

G. Wickwar: a few on June 3; Hanham: fairly common by R. Avon on June 4; nr. Tockington: fairly common, June 1 (D.A.S.).
S. Pill: one male on May 17 and 25 (J.F.B.); Churchill district: "rather more than in 1962, but not common. First seen May 15. Ova and larvae very numerous in June" (E.W.); Tickenham: one, June 2 (J.R.J.W.); Axbridge Hill: seen on May 9 (K.H.P.).

Gonepteryx rhamni Linn. (Brimstone)

Still very scarce.

G. Filton: one on April 19 (R.A.).
S. Portishead: one male flying N.E. along coast at Battery Point (J.F.B.); Nailsea district: not seen in 1963 (J.R.J.W.); Churchill district: very scarce. None seen in spring (usually frequent). One male on Sept. 12, 13, 16 and 17. No females seen (E.W.); Sand Bay: one, May 12 (R.A.); Shipham: one male, Sept. 14 (J.F.B.); Shapwick: 4, April 15 (P.J.C.); Steep Holm: one, Sept. 8 (S.H. Res. Stn. *per* M.A.W.).

Erynnis tages Linn. (Dingy Skipper)

G. Common near Tockington on June 1 and Wickwar on June 3 (D.A.S.).
S. Near Nailsea: more than 12 on June 8 (R.F., J.R.J.W.); Cadbury Camp: 3 on July 21, 28 and 29 (E.C.); West Blagdon: 2 on June 17 in disused railway cutting (R.B., M.K.); Churchill district: several on May 25 and 26, June 4 and 11 (E.W.); Uphill: several rather worn on June 9 (D.A.S.).

Pyrgus malvae Linn. (Grizzled Skipper)

G. Tockington: common, June 1 (D.A.S.).
S. Near Nailsea: at least 2, June 8 (R.F., J.R.J.W.); Churchill district: several, May 23 and 26, June 4 and 11 (E.W.).

Thymelicus sylvestris Pod. (Small Skipper)

G. Kingsweston Down, Bristol: common, Aug. 4 (D.A.S.).
S. Cadbury Camp: abundant, July 27–30 (E.C.); Churchill district: "not very many seen" (E.W.).

Ochlodes venata Br. & Grey (Large Skipper)

Remarkably scarce this year.
G. Tockington: one male, June 1 (D.A.S.); Filton: one, July 8 (R.A.).
S. Abbots Leigh: 3, July 22; Pill: one female, Aug. 5 (J.F.B.); Cadbury Camp: one, July 29 (E.C.); Uphill: several, June 9 (D.A.S.); Kewstoke: one, July 13 (K.H.P.).

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A PORTFOLIO OF DEVONIAN CORAL PAINTINGS BY SPENCER G. PERCEVAL

By B. D. Webby
(Department of Geology, University of Bristol)

THE Devonian faunas of West Somerset have attracted little attention from amateur geologists, apart from the thorough fossil collecting from the Sandhill Farm locality, Withycombe, by Perceval* (1866), and the collecting from scattered fossil localities in the Quantock Hills by Pring and Winwood. The Sandhill Farm occurrence was discovered by Perceval, and yielded a large number of beautiful, differentially-stained corals, coloured in various shades of yellow, red, brown and black. These corals obviously greatly attracted Perceval, causing him to devote many hours to the preparation of polished transverse and longitudinal sections, and even inspiring him to make water-colour paintings of several specimens. His large collection of corals and the portfolio of paintings are now housed in the Department of Palaeontology, British Museum (Natural History). The purpose of this note is to describe briefly the eleven plates in the portfolio. Originally the plates were unnumbered, but numbering has been added in pencil by Dr. W. D. Lang. Plates 1 and 2 are unmounted, and the remainder are mounted on stiff card; they vary in size from the unmounted (21cm × 17cm), to the largest mounted plates (32cm × 27cm). The Indian-ink lettering on the plates is in two different hands: Perceval lists the genus, species and locality, and initials each plate; and Dr. Lang has added the register numbers of the specimens in the British Museum (Natural History).

Plate 1. An unpolished, dark-brown specimen (BM.R.16072)

of *Endophyllum abditum* Milne-Edwards & Haime, correctly identified by Perceval, with a cerioid corallum and rapid outward and upward increase in the number of corallites by branching. The actual specimen is slightly larger than Perceval's painting.

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* Spencer George Perceval (1838–1922), a collector and gentleman of means, was born in West Somerset. For many years he resided at Henbury, Bristol, and took an active interest in mineral and fossil collecting in the West Country. He published a series of notes in the *Geological Magazine* between 1866 and 1878. As an early member of the Bristol Naturalists' Society (1868–1872), he led an excursion to Henbury in 1871, and contributed a preface and notes to the "Journal of an Excursion to Eastbury and Bristol, etc., in May and June, 1767", by Sir Joseph Banks, published in the *Proceedings* of 1901. His collections of minerals from the Mendip Hills (now housed in the British Museum, Natural History) and the Brendon Hills (in the Taunton Museum) are unique. For further details of Perceval's life and work, see his biographical notice in the *Min. Mag.*, **20**, 267.

Plate 2. Another specimen (BM.R.16075) of *E. abditum*, also correctly identified ; highly polished in transverse section, and exhibiting four incomplete corallites. The painting is accurate in detail, the same size as the specimen, and in light-brown and yellow shades.

Plate 3. An unpolished, solitary '*Cystiphyllum*' *secundum* (Goldfuss) (BM.R. 16081), labelled as *Cystiphyllum vesiculosum*, and indicated as "Specimen shewing calix". The painting is in dark-brown colours, and it is an exterior view of the corallum and calice, slightly longer than the actual specimen, but the same width.

Plate 4. Another unpolished, solitary specimen (BM.R.16089) of '*C*'. *secundum*. The painting is the same scale as the actual specimen (10cm × 5cm); it is in brown shades, and consists of two exterior views, one showing the calice and outer surface of the corallum, the other (the reverse side), showing only the outer surface, including transverse annulations. Labelled as *C. vesiculosum*.

Plate 5. As noted by Perceval, a "Branching specimen" (BM.R.16078) of '*C*'. *secundum*. The painting depicts a specimen slightly longer than the actual specimen, it being an exterior view of the corallum in mauve and brown shades. Labelled as *C. vesiculosum*.

Plate 6. Another exterior view of a "Branching specimen" (BM.R.16082) of '*C*' *secundum*. The painting is near to the actual size of the specimen, and is in a dull-brown colour. Identified as as *C. vesiculosum* by Perceval.

Plate 7. A solitary specimen (BM.R.16088) of '*C*'. *secundum*, highly-polished longitudinal section. This colourful painting is a good representation of the specimen, showing tabellae and dissepiments, and measures up to 13cm. long by 6.2cm wide. Labelled *C. vesiculosum*.

Plate 8. Large solitary coral (BM.R.16087) of *Mesophyllum* (*Arcophyllum*) *sandhillense* Webby, seen in polished longitudinal section (see Webby, 1964, text-fig. 5b). The painting is a faithful representation of the specimen, although a little larger, and colours are varied, in shades of yellow, red and brown. It exhibits septa, dissepiments, carinae and tabellae. Identified by Perceval as *C. vesiculosum*.

Plate 9. Compound specimen (BM.R.16084)of '*C*'. *secundum*, seen in polished longitudinal section, and indicated by Perceval as "Specimen with numerous branches". The branches are, in fact, veins of dolomite and calcite. The painting of this specimen is quite accurate; it is labelled as *C. vesiculosum.*

Plate 10. This plate includes two coral species. Figs. 1–1a consist of a transverse section and a lateral view of a small, solitary '*C*'. *secundum* (BM.R.16090). Figs. 2, 2a-b consist of three transverse sections of a specimen of *M.* (*A.*) *sandhillense* (BM.R.16085–6) (see Webby, 1964, text-fig. 5a). All these specimens are fairly accurately represented in the painting, in shades of red, brown and yellow. Perceval identified all these specimens as *C. vesiculosum.*

Plate 11. A conical, solitary specimen of '*Cystiphyllum*', labelled by Perceval as *C. vesiculosum.* In his painting it is shown as 12.3cm long with a maximum diameter of 7.2cm at the top. The specimen is missing.

ACKNOWLEDGMENTS

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THE SILURIAN—OLD RED SANDSTONE UNCONFORMITY AT BUCKOVER, NEAR TORTWORTH, GLOUCESTERSHIRE

By M. L. K. Curtis and R. Cave

A NEW section at the south-western extremity of the Tortworth Inlier, and about two miles east-north-east of Thornbury, shows an unconformable relationship between the Wenlock Series of the Silurian and the Upper Old Red Sandstone. The unconformity is exposed in a deep cutting recently made on the main Bristol to Gloucester road, ¼ mile north-east of the White Horse Inn at Buckover. The details recorded here are the result of observations made throughout the year 1963 when excavation was in progress. The sides of the cutting have since become considerably obscured by soil and vegetation, and only part of the succession as described can now be seen.

A detailed map and description of the section and a considerable collection of fossils and rock specimens from the Silurian and Old Red Sandstone are preserved in the geological collections of the City Museum, Bristol, and a copy of the map and description has been deposited at the Geological Survey, London.

POSITION OF THE SECTION

The section extends north-eastwards from near the White Horse Inn, Buckover. The beds dip to the west, and their outcrops run obliquely across the cutting, progressively younger beds being encountered as traced in a south-westerly direction (Figs. 1 and 2). The oldest strata are purplish-red mudstones of Wenlock age seen on the eastern side of the cutting, 600 yds. N.44°E. of the White Horse Inn, and 210 yds. east of Buckover Cottages (Map Reference ST/6677 9078). The junction between the Silurian and Old Red Sandstone is exposed in the western bank, 460 yds. N.43°E. of the White Horse Inn, and 150 yds. S.E. of Buckover Cottages (ST/6668 9071). The highest beds of the Upper Old Red Sandstone recorded in the section were seen in a ditch 50 yds. E.N.E. of the White Horse Inn (ST/6644 9040); these consist of soft red and green flaggy sandstones and sandy clays. On the western side of the road, about

240 yds. N.E. of the White Horse Inn, the Old Red Sandstone is overlain by a rubbly deposit of Dolomitic Conglomerate similar to that seen in the fine road-side exposure 120 yds. S.W. of the inn.

STRUCTURE

The section is situated on the eastern limb of a sharp southerly-pitching syncline, the axis of which runs through Buckover and Milbury Heath. This syncline is apparently complementary to the southerly-pitching anticline of Whitfield and Horseshoe Farm, which in turn is complementary to the northern portion of the great synclinal fold of the Bristol Coal Basin.

The strata exposed in the Buckover section display a constant westerly dip, but the angle of dip gradually decreases from north-east to south-west as the centre of the syncline is approached. The Wenlock beds at the north-eastern end of the section are inclined at about 37°, but towards the unconformity the angle is about 34°. The dip of the Old Red Sandstone appears to diminish from about 33° near the base to 20° or less in the highest beds at the south-western end, but the inclination of these sandstones is difficult to measure because of current-bedding.

The rocks are cut by a series of small faults trending between west and north-west, with the downthrow, in general, to the south. One of these faults, with a downthrow of about 17 ft. to the south, displaces the unconformity itself. Another affects the Old Red Sandstone only; its throw cannot be determined with certainty owing to the difficulty of matching the beds on either side, but a downthrow to the south of at least 30 or 40 ft. is probable. In the north-eastern part of the section several small faults cause displacement of the Silurian beds. In some of these the downthrow is to the south, and in others to the north ; but in several cases the throw varies along the line of the fault, and some of these faults appear to die out within a short distance.

On the Geological Survey One Inch map of the Bristol District (1962) a north—south fault, the Whitfield Fault, with a downthrow to the west, is shown as following approximately the line of the present road cutting. No evidence of this fault has been observed in the cutting, but there must be a major north—south fault close to the west, bringing the Lower Old Red Sandstone of the Crossways area against the Wenlock rocks of the Whitfield area, and thus accounting for the absence of Thornbury Beds in the Buckover section. This is probably a continuation of the great north—south fault which can be traced northwards from Stone Bridge to Purton, and which throws down Lower Old Red Sandstone and Ludlow

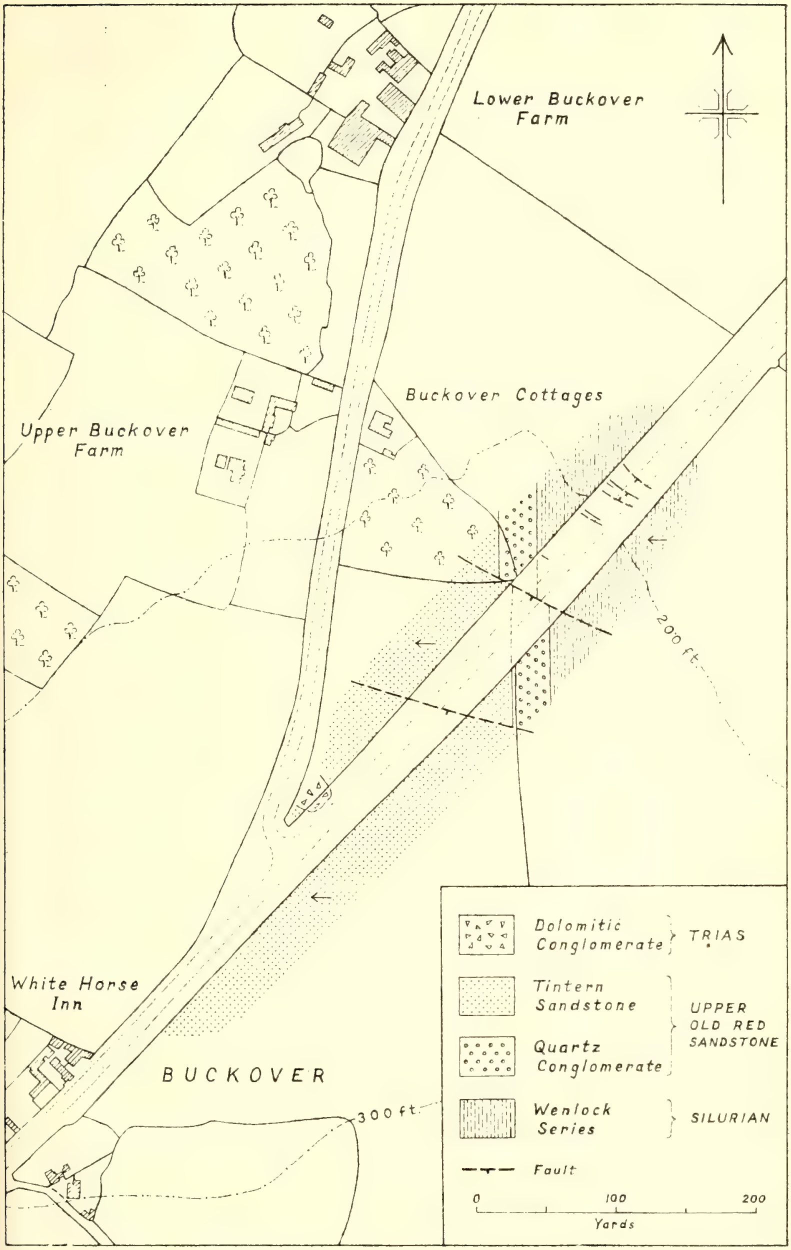
Lower Buckover Farm
Buckover Cottages
Upper Buckover Farm
200 ft.
White Horse Inn
BUCKOVER
300 ft.
Dolomitic Conglomerate
TRIAS
Tintern Sandstone
Quartz Conglomerate
UPPER OLD RED SANDSTONE
Wenlock Series
SILURIAN
Fault
0
100
200
Yards

FIG. 1. *Position of the Buckover Section.*

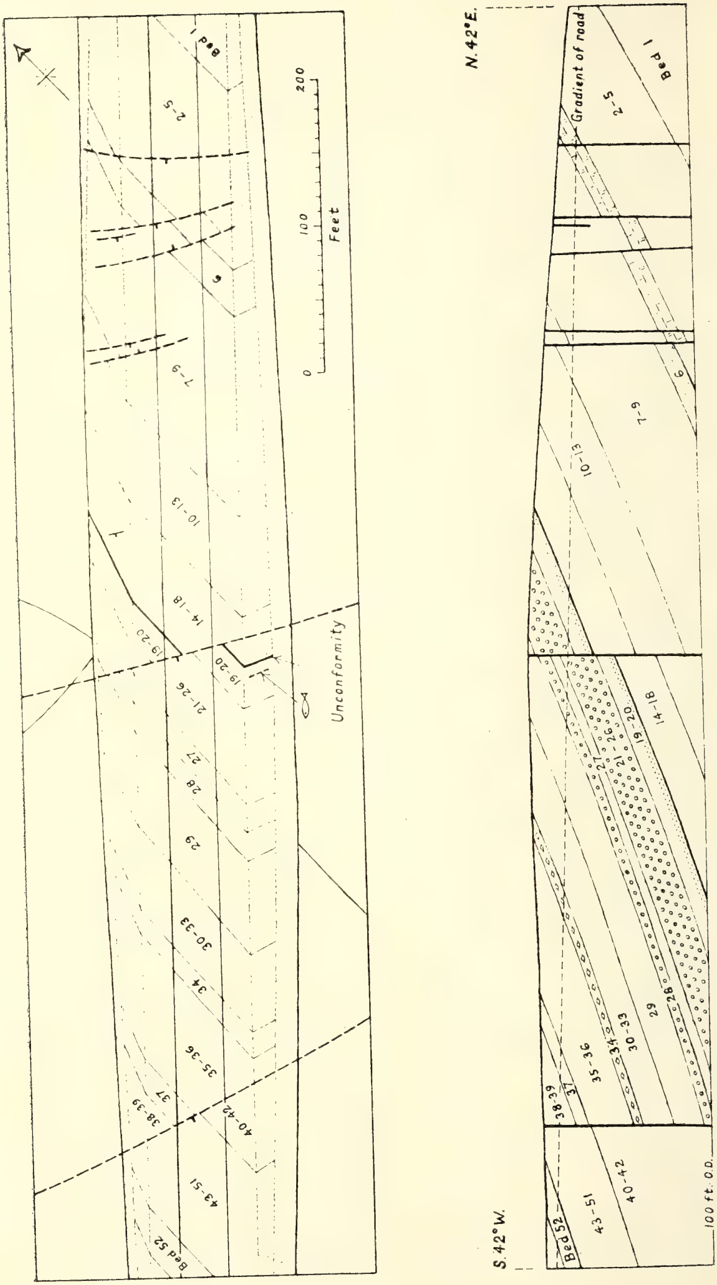
Bed 1
2-5
6
7-9
10-13
14-18
19-20
21-26
27
28
29
30-33
34
35-36
37
38-39
40-42
43-51
Bed 52
0
100
200
Feet
Unconformity
N. 42°E.
S. 42°W.
Gradient of road
100 ft. O.D.

FIG. 2. *Map and section of part of the Buckover road cutting.*
(Horizontal and vertical scales the same.)

rocks to the west against Wenlock, Llandovery and Tremadoc rocks to the east (Curtis, 1955, fig. 1, p. 4).

SILURIAN ROCKS

The Silurian rocks seen in the Buckover section are considered to occupy a high horizon in the Wenlock Series. The Wenlock succession as developed in the south-western part of the Tortworth Inlier, around Whitfield and Horseshoe Farm, consists of some 800 ft. of shales, mudstones, siltstones and calcareous sandstones, with three prominent limestone bands (Kellaway & Welch, 1948, p. 12; Curtis, 1955, p. 6). It is to the highest part of this succession that the strata exposed in the new road cutting belong. Over 180 ft. of beds were exposed in the cutting, consisting predominantly of mudstones and siltstones. The lower beds, about 130 ft. thick, are mainly purplish-red mudstones with occasional thin green streaks (Beds 1–9); they are sometimes slightly calcareous, and at two horizons contain layers of hard calcareous nodules. About 50 ft. below the top of this purplish-red mudstone group is a band of hard purple and grey argillaceous limestone, 12 ft. thick, and a few feet above it is a richly fossiliferous horizon. This limestone is undoubtedly the highest of the three limestones referred to above ; it probably thickens eastwards for between Horseshoe Farm and High Wood it forms a prominent ridge.

The highest 53 ft. of Silurian beds consist mainly of silty mudstones, sitlstones and fine-grained sandstones (Beds 10–18), the lower part being mostly yellowish-green and brown, and the upper part showing alternations of green and purplish-red. A considerable fauna has been obtained from this portion of the succession, particularly from Bed 10 which consists of yellowish-green siltstone with hard bands of yellowish-brown, fine-grained calcareous sandstone, often highly fossiliferous. These highest Silurian rocks are identical with the fossiliferous siltstones and sandstones formerly exposed in the well-known lane section at Horseshoe Farm, ½ mile to the south-east (Reed & Reynolds, 1908a, pp. 524, 537 ; 1908b, p. 40). There has been much doubt in the past as to whether the beds at Horseshoe Farm belong to the Wenlock or the Ludlow Series. Murchison, Phillips and other nineteenth century geologists assigned them to the latter. Reed and Reynolds agreed that the fauna from this locality, and the fauna obtained by them from trenches south of Little Daniel's Wood, contained some elements having Ludlow affinities, but considered the fauna as a whole to indicate a Wenlock age. This view is confirmed by the evidence of the Buckover section. The purplish-red mudstones (lower part of

Bed 7), which overlie the limestone, contain a typical Wenlock fauna including *Favosites gothlandicus forbesi* (Edwards and Haime), *Meristina obtusa* (J. Sowerby), *Trigonirhynchia stricklandi* (J. de C. Sowerby), *Leptaena depressa* (J. de C. Sowerby), *Strophonella funiculata* (M'Coy) and *Dalmanites myops* (König). The highest part of the Silurian succession, comprising 53 ft. of siltstones and fine-grained sandstones (Beds 10–18), has yielded a large fauna which includes *Craniops implicata* (J. de C. Sowerby), *Howellella* sp., *Meristina obtusa* (J. Sowerby), *Leptaena rhomboidalis* (Wilckens), *Strophonella funiculata* (M'Coy), *Fardenia applanata* (Salter), *F. pecten* (Linnaeus), *Chonetes ceratoides* Reed, *Actinopteria* cf. *pleuroptera* (Conrad), *Cornellites* sp., *Dalmanites myops* (König) and *Homalonotus* sp. An interesting feature of this fauna is the abundance of lamellibranchs.

An indication of the shallow water conditions under which these highest Silurian beds were deposited is provided by the occurrence in the fine-grained sandstones of small-scale current-bedding, ripple-marks and small drag-marks. There is also evidence that these rocks suffered disturbances which were penecontemporaneous with their deposition. Bed 18, for example, is a fine-grained yellow sandstone containing pebbles of similar material; the upper laminated part of this bed seems to have been broken when partially consolidated, and penetrated from below by argillaceous sediment which was still in a plastic condition. The occurrence of rounded masses and curved bedding in Beds 12 and 13 may likewise be attributed to penecontemporaneous disturbance.

The Silurian succession is shown below in descending order. In the lower portion (Beds 1–7) the thicknesses given were calculated from the widths of the outcrops, and in the upper portion (Beds 8–18) the thicknesses were obtained by direct measurement.

		Ft.	Ins.
(18)	Hard yellow current-bedded, fine-grained calcareous sandstone, weathering to a brown laminated rottenstone, and containing abundant crinoid ossicles ..	1	6
(17)	Silty mudstone with some silty sandstone bands, mainly green below and red and green above ..	4	0
(16)	Purplish-red shaly mudstone, with occasional bands of hard, green, fine-grained sandstone, and with a thin layer of green clay at the base	6	6
(15)	Banded green and purplish-red silty mudstone, with some hard sandy siltstone bands	8	6
(14)	Banded green and purplish-red silty mudstone, with occasional bands of hard, fine-grained sandstone, and a few pale green clay partings	5	6
(13)	Green siltstone, with some sandier bands showing fine current-bedding, and containing rounded masses with curved bedding	4	0
(12)	Brown sandy siltstone, showing some curved bedding, and with abundant fossils	3	0

		Ft.	Ins.
(11)	Banded green and purplish-brown silty mudstone ..	2	0
(10)	Yellowish-green siltstone, with bands of harder siltstone. Bands of yellowish-brown, fine-grained calcareous sandstone, up to 1 ft. thick, and sometimes highly fossiliferous, are most abundant in the middle and upper part. Some reddish-brown and purplish-brown streaks occur towards the base and top ..	18	0
(9)	Purplish-red mudstone and silty mudstone, with thin layers of slightly harder siltstone, and two 4 in. bands of fine-grained sandstone	10	0
(8)	Banded purplish-red and drab green mudstone and sandy mudstone, with a band of green argillaceous sandstone, 7 ins. thick, at the base	4	6
(7)	Purplish-red mudstone, with green streaks, and occasional bands of green mudstone and sandy mudstone up to 1 ft. thick. Abundant fossils occur in a bed of purple mudstone, apparently about 6 ft. above the base	33	0
(6)	Hard, purple and purplish-grey argillaceous and silty limestone, occurring in lumpy, irregular beds with clay partings. The highest 2 ft. is the most massive and regularly bedded. Drusy cavities, up to an inch or two across, contain small crystals of white and pink celestine. About 2 ft. above the base is a band of purplish-blue clayey mudstone, 9 ins. thick	12	0
(5)	Purple and purplish-red mudstone with occasional calcareous nodules, and in the lower part a few seams of nodular, lumpy limestone, up to 9 ins. thick ..	9	0
(4)	Purplish-red mudstone, slightly calcareous towards the base, with a green limestone and mudstone band, 3 ins. thick, at the base	13	0
(3)	Purplish-red mudstone, with occasional thin green and purplish-blue bands. Nodular lumps of purple limestone, up to about 4 ins. thick, occur in the lower part	8	0
(2)	Purplish-red mudstone, with an occasional calcareous nodule in the upper part, and with occasional thin green and purplish-blue bands and streaks	26	0
(1)	Soft purplish-red mudstone, with occasional very thin green partings. Not well exposed	15	0

OLD RED SANDSTONE

A thickness of more than 300 ft. of Old Red Sandstone sediments has been observed in the Buckover section. That these beds belong to the Farlovian or Upper Old Red Sandstone is indicated by the occurrence of scales and plates of *Bothriolepis* cf. *hydrophila* (Agassiz) in a thin bed, 4 ft. above the base, here named the Buckover Fish Bed. The succession is similar to that described in Monmouthshire and around the Forest of Dean (Welch & Trotter, 1961, pp. 49–57; Trotter, 1942, pp. 9–11), and the two main subdivisions of the Upper Old Red Sandstone seen in those areas, the Quartz Conglomerate below and the Tintern Sandstone above, can be recognised also in the Buckover section. These two groups have already been described as occurring in the Thornbury and Tortworth areas (Kellaway & Welch, 1955, pp. 5–7 ; Welch & Trotter, 1961, p. 57), but most of the existing exposures are small, and the new road cutting at Buckover provides the most complete succession in these formations to be seen anywhere east of the River Severn.

The Quartz Conglomerate at Buckover is about 47 ft. thick, and consists of two bands of massive conglomerates and sandstones, the lower one 22 ft. thick and the upper one 7 ft. thick, separated by 6½ ft. of rather thinly-bedded sandstone. About 12 ft. of beds occur below the massive conglomerates and sandstones ; they include at the base a bed of hard sandstone, about 1 ft. 9 ins. thick, and just above the middle a 6 in. band of sandstone showing well-developed symmetrical ripple-marks.

The Tintern Sandstone consists of a variable series of sandstones, siltstones and 'marls' with occasional rubbly bands of nodular cornstones. The thickness seen is probably not less than 250 ft., and may be more than 300 ft. The basal beds of the Tintern Sandstone are rather soft, and consist of purplish-brown and red fine-grained, thinly-bedded sandstones, succeeded by coarser sandstones with a bed of red marl, and at the top a conspicuous bed of hard purplish-blue rubbly conglomeratic cornstone (Beds 29–34). The main portion of the Tintern Sandstone (Beds 35–65) consists of purplish-brown, pale green, grey and yellow sandstones, generally strongly current-bedded. These sandstones are normally hard and rather massive, but flaggy and more thinly-bedded sandstones are also common. Interbedded with the hard sandstones are beds of siltstone and 'marl', and occasional layers of clay and bands of rubbly cornstones. The highest beds of the Tintern Sandstone occurring in the section (Beds 66–72), although only intermittently exposed, were seen to consist of soft thinly-bedded sandstones and soft sandy clays, with occasional lines of cornstone nodules. The ochreous appearance of the cornstones in the upper part of the succession has almost certainly been caused by the once overlying Dolomitic Conglomerate.

The Buckover Fish Bed is a purplish-brown, green and yellow sandstone band, 3 ins. thick, containing white scales and plates of *Bothriolepis* cf. *hydrophila*, and is situated 4 ft. above the unconformable base of the Quartz Conglomerate. On the eastern side of the road cutting the bed contains abundant fish remains, but on the western side only isolated scales were found at this level. Fragmentary fish scales have also been found about 7 ft. higher in the succession. It is interesting to recall in this connection that long ago a scale of *Holoptychius* sp. was found near the base of the Upper Old Red Sandstone at Milbury Heath (Smith, 1934, pp. 119–20). No fish beds have been reported from the Quartz Conglomerate or the lower part of the Tintern Sandstone in the Forest of Dean or Monmouthshire. At Portishead in Somerset the well-known Woodhill Bay Fish Bed occurs about 50 ft. above the base of the Portishead Beds, but it is not easy to correlate the Portishead succession with that further north (Wallis, 1928, pp. 768–9; Kellaway & Welch, 1955, p. 6).

In the following details of the Old Red Sandstone succession at Buckover, the thicknesses given for the beds of the Quartz Conglomerate were obtained by measurement. The thicknesses of the beds comprising the Tintern Sandstone, on the other hand, have been calculated from the widths of their outcrops, and become increasingly less accurate towards the top of the succession owing to the strongly current-bedded nature of the sandstones and the difficulty of determining the amount and direction of their dip. This is particularly so in the case of Beds 56–72 which were observed only in a trench excavated along the eastern side of the road, and the estimated thicknesses of Beds 66–72 (shown in square brackets) are very approximate indeed.

TINTERN SANDSTONE

		Ft.	Ins.
(72)	Occasional exposures of soft red and green thinly-bedded sandstone and sandy clay	[10	0]
(71)	Green and red sandy 'marl' with occasional thin layers of yellow cornstones	[15	0]
(70)	Soft brownish sandstone, with occasional green clays and layers and isolated nodules of yellow cornstone ..	[7	0]
(69)	Green clay, slightly sandy towards base, with occasional layers of hard ochreous cornstone nodules ..	[23	0]
(68)	Soft pale green micaceous sandstone, strongly current-bedded	[8	0]
(67)	Pale-green, grey and purplish-brown sandstone, with coarse-grained and pebbly layers, mostly rather flaggy and current-bedded	[20	0]
(66)	Soft, pale green and purplish-brown, thinly-bedded sandstone. Lower part coarse-grained with occasional small pebbles; upper part current-bedded with occasional thin bands of harder sandstone. A band of green, slightly sandy clay occurs at the top	[14	0]
(65)	Pale green, grey and brown, rather flaggy sandstone, coarse-grained and pebbly at base and in upper part	5	0
(64)	Soft, pale green shaly sandstone, with a band of pink nodular cornstones, 6 ins. thick, at the base	1	6
(63)	Red 'marl' with occasional thin layers of soft green sandstone, especially in the lower part	13	0
(62)	Yellow, grey and pale green, hard quartzitic sandstone, coarsely slabby and much jointed. A band of green sandy clay occurs near the top	6	0
(61)	Pale green flaggy sandstone, mostly rather soft, but hard and current-bedded towards base. A band of rubbly ochreous cornstone, 1 ft. thick, occurs at the top	7	0

		Ft.	Ins.
(60)	Purplish-brown and green sandstone. Lower part flaggy and current-bedded; upper part coarse-grained and pebbly, becoming rather soft and fissile towards the top	17	0
(59)	Red and green silty and sandy beds with abundant rubbly yellow and green cornstones	4	0
(58)	Soft red and green sandstone and siltstone, with bands of purplish-brown and green sandstone. The lowest 4 ft. consist of purplish-brown, green and grey flaggy sandstone	15	0
(57)	Red 'marl'	3	0
(56)	Purplish-brown and green flaggy sandstone	2	0
(55)	Purple siltstone and sandstone with small nodular cornstones	2	6
(54)	Hard purplish-brown and green sandstone	2	6
(53)	Purple fissile sandstone, soft and highly micaceous	2	0
(52)	Hard purplish-brown and green current-bedded sandstone; flaggy, especially in upper part	11	0
(51)	Soft red sandy marl with green patches	2	0
(50)	Purplish-brown and green flaggy sandstone	1	0
(49)	Dark purple sandstone, soft and thinly-bedded, with nodular masses of purple and green cornstones becoming abundant towards the top	3	6
(48)	Hard purplish-brown, pale green and grey, current-bedded sandstone, with a band of bright green clay, 4 ins. thick, a little above the middle	8	6
(47)	Soft purple and green micaceous sandstone	2	0
(46)	Hard grey current-bedded sandstone	2	0
(45)	Clay, red below and green above	2	0
(44)	Hard, massive grey and pale green sandstone; lowest foot contains abundant ochreous fragments	6	0
(43)	Purplish-brown, pale green and grey sandstone. Lowest 6 ins. contains abundant ochreous fragments, and at the top is a green siltstone band, 5 ins. thick	5	6
(42)	Red siltstone and fine-grained, thinly-bedded sandstone, with some green patches. A pale green sandstone band, 2 ft. thick, occurs about the middle and a green siltstone band, 1 ft. thick, at the top	9	0
(41)	Hard, purplish-brown and green current-bedded sandstone	2	0
(40)	Red siltstone and fine-grained thinly-bedded sandstone with green seams and patches. Possibly equivalent, in part, to Bed 39	4	0
	FAULT		
(39)	Red siltstone and fine-grained thinly-bedded sandstone with occasional green patches	7	0
(38)	Hard purplish-brown and green sandstone	2	0
(37)	Red 'marl' with occasional green patches, rather sandy and crumbly	7	6
(36)	Purplish-blue and green rubbly siltstone with small yellow cornstones	2	0
(35)	Purplish-brown and green sandstone, mostly rather hard and massive, and often showing current-bedding; pebbly at base with quartz pebbles up to ¼ in. across	27	6
(34)	Hard, purplish-blue rubbly conglomeratic cornstone. Irregularly coloured; mainly purplish-blue, with green, yellow and reddish-brown	5	6
(33)	Hard purplish-brown and green sandstone	3	0

		Ft.	Ins.
(32)	Soft sandstone. Lower part dark purple with green patches; upper part dark red and purple	6	0
(31)	Soft red argillaceous siltstone or 'marl'; rapidly breaking down on weathering	8	0
(30)	Soft argillaceous sandstone; lower part mainly yellow and green, and upper part purplish-red	3	0
(29)	Purplish-brown and red fine-grained, thinly-bedded sandstone. Mostly rather soft, but slightly above the middle is a harder bed with purplish-blue and grey patches	21	0
	QUARTZ CONGLOMERATE		
(28)	Hard, massive, yellowish-grey, pale green and purplish-brown sandstone, often pebbly, and showing current-bedding. Beds of hard conglomerate, which may be a foot or more thick, occur in the sandstones, but seem to wedge out rapidly. Pebbles, mainly of quartz, are well rounded and up to 1½ ins. across; other pebbles include red jasper, and in some beds there are bright green mudstone pellets	7	0
(27)	Thinly-bedded and flaggy silty sandstone; rather soft, and purplish-brown and red in colour with green patches	6	6
(26)	Hard, massive, current-bedded sandstone; greyish-green, yellowish-green and purplish-brown. Occasional thin conglomeratic seams occur, and some beds contain isolated quartz pebbles up to 1 in. across. Pebbles of soft purplish-brown sandstone and siltstone and green mudstone occur near the top	7	0
(25)	Hard greyish-green and yellowish-green conglomerate, with pebbles, mainly of quartz up to 1 in. across. Other pebbles include jasper; at some levels there are soft brown sandstone and siltstone pebbles, and at others green mudstone pebbles..	3	3
(24)	Hard yellowish-green conglomeratic sandstone, with pebbles mainly of quartz	2	0
(23)	Conglomerate, with a brown, green and yellowish matrix, and pebbles, mainly of white quartz, up to 1½ ins. across. The upper part is hard and current-bedded, but the whole is rather poorly cemented and weathers to a friable gravel. Thin layers and partings of pale sandstone and red shaly mudstone occur ..	6	9
(22)	Red shaly mudstone and green sandy siltstone ..	2	6
(21)	Yellowish-green conglomerate, with rounded quartz pebbles up to ½ in. across, weathering to a friable gravel	–	8
(20)	Purplish-brown and green mudstone, siltstone and fine-grained, thinly-bedded sandstone. The lowest beds contain flow-rolls with concentric banding. A 3 in. sandstone (Buckover Fish Bed) occurs 2 ft. 2 ins. above the base. A 6 in. sandstone, with the top surface extensively covered with symmetrical ripple-marks having a wavelength of about 1 in., occurs about 5ft. 5 ins. above the base	10	0
(19)	Hard purplish-brown and green sandstone. The lowest 3–4 ins. is pebbly in some places, with quartz pebbles up to about ¼ in. across, and pebbles and fragments of green mudstone and yellow decalcified sandstone similar to Bed 18 of the underlying Silurian	1	9

THE SILURIAN—OLD RED SANDSTONE UNCONFORMITY

The Silurian—Old Red Sandstone unconformity represents a very considerable stratigraphical break. The highest Silurian rocks seen in the Buckover section are believed to be near the top of the Wenlock Series, and these are overlain by beds belonging to the Upper Old Red Sandstone. The Ludlow Series of the Silurian, the Lower and Middle Old Red Sandstone, and possibly part of the Upper Old Red Sandstone are absent. Although the unconformity is a major one, no well-defined angular discordance between the Silurian and Old Red Sandstone can be seen in the road cutting. Indeed, even the position of the unconformity itself is not at first obvious owing to the similarity of the highest Silurian and lowest Old Red Sandstone sediments, both consisting of rather thinly-bedded purple and green siltstones and sandstones. Nor is there a well-marked basal conglomerate. The lowest bed of the Old Red Sandstone is a hard purplish-brown and green sandstone, 1 ft. 9 ins. thick, the lowest 3 or 4 ins. of which is inclined to be pebbly, with quartz pebbles up to about $\frac{1}{4}$ in. in diameter. This pebbly bed rests on approximately the same horizon in the Silurian across the whole width of the road cutting.

The unconformable junction was seen most clearly on the eastern side of the cutting where the basal bed of the Old Red Sandstone (Bed 19) is in contact with a conspicuous calcareous sandstone band in the Silurian (Bed 18) ; the latter is a fine-grained, current-bedded sandstone, 1 ft. 6 ins. thick, which in a fresh condition is an intensely hard yellow rock, but weathers to a laminated brown sandy rottenstone. In some places the unconformable surface is sharp and only slightly uneven. In other places it is more irregular with elevations and depressions of about an inch ; and sometimes narrow infillings of pebbly sandstone and conglomerate can be seen penetrating an inch or two downwards into the underlying Silurian sandstone, filling cracks which often have smooth weathered sides. Detached and partially detached flakes of Silurian sandstone are seen in the Old Red Sandstone adjacent to the contact. On the western side of the cutting the junction is more obscure; in some places the relationship appears to be the same as that on the eastern side, but at one place (Pl. VII, 1) it was observed that greenish siltstones occur in the position normally occupied by the fine-grained sandstone (Bed 18).

Considered more generally, the unconformity beneath the Upper Old Red Sandstone is one of the most widespread stratigraghical breaks in the Palaeozoic rocks of southern Britain.

Throughout most of South Wales and the Welsh Borderland the Upper Old Red Sandstone rests on the Brownstones, the highest subdivision of the Lower Old Red Sandstone, but there is generally little or no discordance between the two formations. This relationship is found to exist in Monmouthshire and around the Forest of Dean, although in one area, near Mitchel Troy, south of Monmouth, the Quartz Conglomerate oversteps the Brownstones, and comes to rest on the St. Maughan's Group, apparently due to gentle folding during pre-Upper Old Red Sandstone times (Welch & Trotter, 1961, pp. 4, 8). Along the eastern margin of the Forest of Dean syncline, and southwards as far as Tidenham Chase, the Quartz Conglomerate rests on Brownstones, but east of the Severn, around Thornbury, it overlies the Thornbury Beds which have been tentatively correlated with the Raglan Marls (Welch & Trotter, 1961, pp. 8, 32, 46). In the Buckover road cutting the Upper Old Red Sandstone comes to rest directly on Silurian rocks, thought to be near the top of the Wenlock, and this relationship appears to exist over the distance between Buckover and Tortworth. However, south of Little Daniel's Wood, near Tortworth, a major north—south fault, which is unmistakably of pre-Upper Old Red Sandstone age, has a downthrow to the west with the result that the Quartz Conglomerate between this point and Tortworth Church rests on beds near the base of the Wenlock Series (Reed & Reynolds, 1908a, fig. 3, p. 518 ; Curtis, 1955, fig. 1, p. 4). Thus, as followed eastwards from Tidenham Chase, across the Severn to the village of Tortworth, a distance of about 9 miles, the Upper Old Red Sandstone is found to overlie rocks which seem to belong to progressively lower horizons. There is no evidence throughout this region of any marked angular discordance at the unconformity which would account for extensive overstepping by the Upper Old Red Sandstone. It is therefore suggested that an explanation of this phenomenon is the presence of a series of major north—south faults of pre-Upper Old Red Sandstone age with the downthrow in each case to the west. One such fault, referred to above, emerges from beneath the Upper Old Red Sandstone outcrop south of Little Daniel's Wood, near Tortworth, and can be traced northwards along the western side of Daniel's Wood, with a downthrow to the west of at least 500 ft., and possibly over 1,000 ft. Another is the fault extending from Stone Bridge to Purton (p. 428), which brings Ludlow and Lower Old Red Sandstone to the west against Tremadoc, Llandovery and Wenlock rocks to the east, and the southerly continuation of which probably accounts for the juxtaposition of the Thornbury Beds and the Wenlock Series in the area between Crossways and Whitfield ; the throw of this fault is probably to be measured in thousands of feet. Other faults having approximately the same trend are the Blakeney Fault, east of the Forest of Dean, and a fault observed on Black Rock, in the Severn near Berkeley (Welch & Trotter, 1961, pp. 7, 14–15, 45), but the ages of these are unknown.

The absence of part of the Upper Silurian and the whole of the Lower Old Red Sandstone at Tortworth, in contrast to the thick development of these formations in the area immediately to the west, suggests that the major north—south faulting described above, and the very extensive erosion which must have followed it, occurred mainly in 'Middle' Old Red Sandstone times (*i.e.* post-Brownstones, pre-Quartz Conglomerate). The magnitude of the faulting and subsequent erosion is indicated by the fact that along the eastern margin of the Forest of Dean and in the Purton and Sharpness area these deposits attain a thickness of at least 3,000 ft., probably considerably more, and around Thornbury the thickness of the Lower Old Red Sandstone is considered to be not less than 1,000 ft. (Welch & Trotter, 1961, pp. 28, 32). It seems reasonable to suppose that a substantial part of this great thickness originally extended eastwards across the Tortworth area, and was removed by erosion prior to the deposition of the Upper Old Red Sandstone. Unfortunately, however, there is no direct evidence as to the original thickness of these deposits at Tortworth. Thus the possibility remains that the major north—south faults may have been active over a long period and may have had a controlling effect on sedimentation, producing a somewhat attenuated Ludlow and Lower Old Red Sandstone succession in the Tortworth area, while allowing a greater thickness of sediments to accumulate to the west (Kellaway, 1961, p. 28). If this were so, considerably less pre-Upper Old Red Sandstone erosion would have been needed to produce the unconformity at Buckover.

Although little is known as to what formations are present beneath the unconformable base of the Upper Old Red Sandstone to the east and south of the Tortworth Inlier, some information is provided by the recent Geological Survey borehole at Hamswell, near Bath, where 960 ft. of Lower Old Red Sandstone sediments were encountered (Cave, 1963, p. 35). Fish remains from the lowest 6 ft. of this borehole and from a small faulted outcrop of Lower Old Red Sandstone at Wickwar (Whittard & Smith, 1944, pp. 69–70) are suggestive of divisions I6 or I7 and 'I8 or lower' respectively of Wickham King's classification, and permit a general comparison with the Downtonian of the Sharpness area (White, 1946, pp. 213–4) and the Forest of Dean (Welch & Trotter, 1961, pp. 31–2, 38, 43–4). The occurrence of thick deposits of Lower Old Red Sandstone at Hamswell suggests that a downfaulted mass of these rocks may occur to the east of the Tortworth area, and that the structural relationship described above for the western side of the inlier may be mirrored to the east. If this hypothesis is correct, the Tortworth area may have stood as a north—south fault ridge or horst during pre-Upper Old Red Sandstone times. It is of interest to note in this connection that both the Tortworth Inlier and the Eastern Mendip Inlier, where a similar unconformity occurs between the Silurian and Upper Old Red Sandstone, are situated on a southward continuation of the Malvern Axis.

SUMMARY

The Wenlock and Upper Old Red Sandstone strata exposed in the Buckover section are described, and it is shown that an unconformable relationship exists between them. The absence of Ludlow and Lower Old Red Sandstone deposits is attributed to major north—south faulting and erosion in pre-Upper Old Red Sandstone times.

ACKNOWLEDGMENTS

We are grateful to Mr. G. R. Smout, Resident Engineer, Gloucestershire County Council, for facilities to examine the section, and for kindly arranging to leave the rocks in the more interesting parts of the section exposed for the benefit of geologists. We wish to thank Dr. E. I. White of the British Museum (Natural History) for identifying the fish remains from the Old Red Sandstone. The participation of one of the authors (R.C.) in the publication of this paper is with the permission of the Director of the Geological Survey.

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EXPLANATION OF PLATE VII

1. The Silurian—Old Red Sandstone unconformity on the western side of the Buckover road cutting. The massive jointed sandstone is the lowest bed of the Upper Old Red Sandstone (Bed 19), and the unconformable junction occurs at the base of it. The highest Wenlock beds at this point are siltstones.

2. A polished section of the unconformity from the eastern side of the cutting (natural size), photographed with a blue filter. An uneven junction is seen between the fine-grained sandstone of the Wenlock (Bed 18) and the coarser sandstone of the Upper Old Red Sandstone (Bed 19), with the latter penetrating cracks in the Wenlock.

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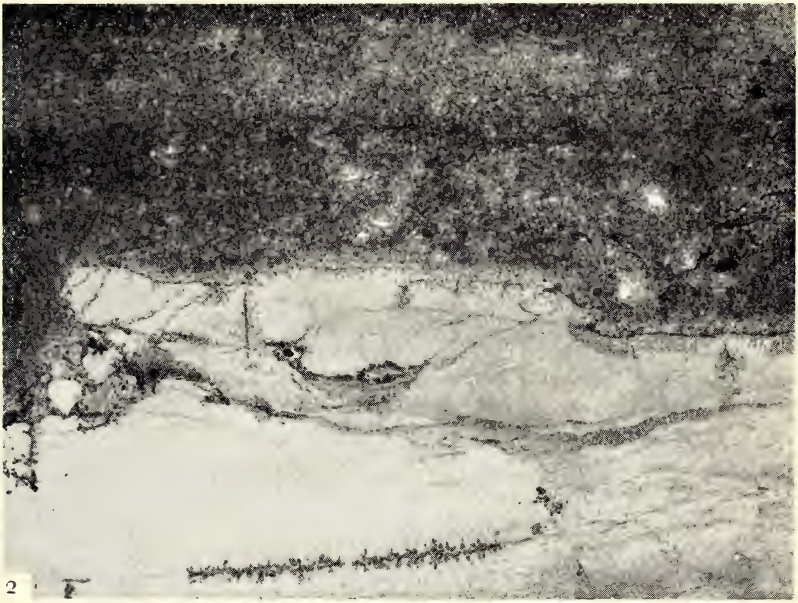

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MALACHITE CRYSTALS OF UNUSUAL HABIT

By C. E. Leese

A FEW specimens of interesting crystals of malachite $Cu_2(OH)_2CO_3$ have recently been collected in North Somerset and X-ray analysis has shown the mineral to have characteristics rare enough to be recorded.

Over a century ago, probably without much profit, copper ores were mined in the Upper Devonian limestones and grits at Dodington, near Nether Stowey. They appear in pockets in the Carboniferous Limestone quarry at Cannington also, and as green and blue stains on joint faces in the Triassic rocks which surround the Palaeozoic uplift. At Cannington there is a spectacular vein of pink baryte stained green and blue on the crystal faces and enclosing geodes of copper minerals. The waste heaps around the shafts at Dodington indicate that the country rock was a mosaic of pearly and pink granules of barytes loosely cemented by malachite and chessylite with occasional clots of both minerals.

It is in a few of the geodes in the Carboniferous Limestone at Cannington that the unusual crystals occur. The cavities in a compact aggregate of limestone and baryte yielded about a dozen specimens. They exhibit a flooring of malachite and chessylite (azurite) in which chalcopyrite and melaconite are embedded, and upon which have developed well-formed crystals of dark blue chessylite and crystals of malachite with spheroidal bodies made up of radiating and silky crystals of malachite. Distributed over the surface of the lining are threads of malachite just visible to the naked eye. Some are straight and others are curved and there is a tendency for them to gather into coralloidal bunches. Generally the final disposition within the geodes was of acicular growths of white barytes, but this order of deposition cannot be regarded as invariable. It is the filiform malachite which has been submitted to X-ray analysis by Miss Linda Carlton, M.A., of the Bristol College of Science and Technology. She has reported her findings at the Congress of the International Union for Crystallography in Rome, September 1963. They are as follows :—

"The largest specimen consists mainly of azurite with large well formed interlocking baryte crystals. Other minerals which have been identified in the specimen are malachite, haematite, and chalcopyrite. Apparently growing on the azurite are small lustrous pale green curved filaments, mostly about 2 mm. long, of varying diameter but about 1 mm. at the widest, and with a radius of curvature down to about 1 mm. or less. A few filaments are curved into complete circles. Microscopic examination reveals azurite crystals apparently growing on some of the filaments, and the latter are rather opaque and have radial striations. Most are roughly circular in cross section, though some are polygonal. Many appear 'frayed' at the ends into separate very fine fibrils.

"The X-ray powder pattern shows the filaments to be malachite. The normal beam single crystal rotation pattern shows that growth was (as usual) along the *c* axis, spacing 3.24 Å (A. F. Wells, *Acta Cryst.*, 1951, vol. 4, p. 200 gives 3.21 Å, *Nat. Bur. Standards* (U.S.), *Rep.* 6415, 1959, p. 15, and A.S.T.M. *X-ray Powder Data File* No. 10-399 give 3.24 Å), but although each reflection is sharply defined along the equator, it is elongated along the azimuth, the elongation increasing with the Bragg angle. Intensity does not vary along each arc. The midpoint of each reflection corresponds exactly with the reflections from a normal malachite crystal (from a spherulite collected near the site of the abnormal crystals) taken in the same camera. The filament rotation pattern was prepared using Cu*Kα* radiation in a 'Unicam' single crystal goniometer with 30 mm. radius camera, and using the ½ mm. diameter collimator. The filament was mounted as nearly vertically as possible by eye, but although a filament with comparatively large radius of curvature was chosen, the portion in the beam was not straight and the elongation of the reflections is probably due entirely to this cause.

"Single crystal patterns were prepared from a stationary filament, and on these all reflections are present at the same relative intensities as in the rotation pattern, although the elongations are less. The layer lines, although well defined, are in general neither parallel with the equator nor symmetrically aligned on either side of the meridian. This means that the filaments are not single crystals but are polycrystalline. There is preferred orientation of the *c* axes of the crystallites along the length of the filament. The crystallites, while being small enough for the uncrushed filaments to give smooth powder diffraction lines on a Guinier picture, obtained from about 24 fibres scattered on a flat surface, are large enough for these lines to be sharp.

"A few filaments have been examined with a micro-probe analyser by Mr. R. J. Pearce of the Berkeley Nuclear Laboratories, Berkeley, Gloucestershire. About 1% zinc is present, homogeneously distributed throughout the filaments, and small quantities of iron in markedly segregated areas, probably separate from the filaments. No other impurity was detected. Zinc has not been detected in the normal malachite crystals by a similar method (sensitivity of method being such as to detect 0.1% Zn). No zinc mineral has yet been identified in the specimen."

THE TRIASSIC DOLOMITIC CONGLOMERATE AND STRUCTURE OF THE OLD RED SANDSTONE, PORTISHEAD COASTAL SECTION, NORTH-EAST SOMERSET

By M. C. Pick
(Department of Geology, University of Bristol)

INTRODUCTION

THE best exposures of Old Red Sandstone in the Bristol area are found in N.E. Somerset, in the coastal section between Portishead and Ladye Bay, Clevedon. Detailed examination of the Old Red Sandstone sequence has led to subdivision into twelve formations ; the stratigraphical descriptions together with an account of the sedimentary features observed in the units are published elsewhere (Pick, 1964).

DOLOMITIC CONGLOMERATE

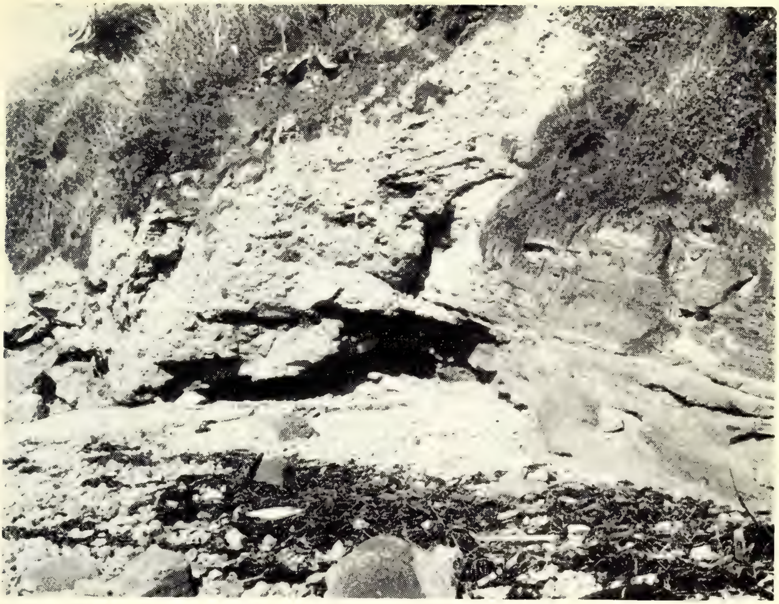
Non-marine Dolomitic Conglomerate of Upper Triassic age rests with marked unconformity on all the Old Red Sandstone formations. The Triassic beds occupy a narrow strip extending along the coast from Kilkenny Bay to Ladye Bay. The seaward margin generally coincides with the edge of the cliffs although small outliers of conglomerate frequently appear on the tidal platform. In a few places such as Black Nore Point and on the northern side of Ladye Bay, the Triassic extends seawards for a considerable distance. Small inliers of Old Red Sandstone are found where the conglomerate cover is thin. The inland margin of the Triassic beds is not well exposed. As indicated by Reynolds & Greenly (1924), it seldom extends for more than 100–200 yds. S.E. of the coast.

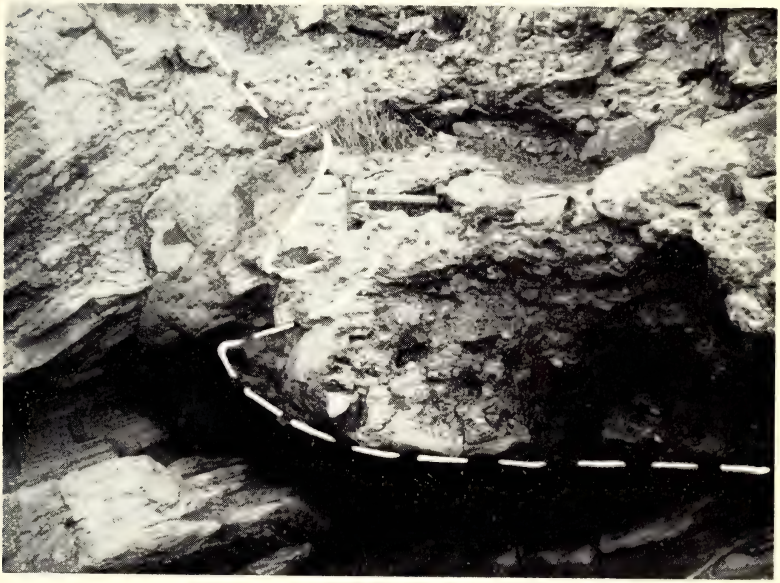
The maximum development of the Triassic is at Ladye Bay where about 200 ft. of beds appear in the cliffs leading south-westwards to Clevedon. Elsewhere the exposed succession is much thinner and rarely attains a thickness of more than about 30-50 ft.; at several places only a few feet of beds may be seen. The succession generally exhibits north-westerly dips of less than 10°. The rocks mostly dip at 3-7° and sometimes at as little as 1°, these attitudes probably mainly reflecting the initial depositional dip. An exceptionally steep dip of 20° was measured at Ladye Bay but the attitude here has probably been influenced by fault drag.

Although the formation dip is low, the underlying surface of unconformity is extremely irregular and in most places displays swells and hollows cut across the Old Red Sandstone beds. Spectacular vertical contacts are visible at localities where the Triassic descends from the top of the cliffs to beach level (Plate VIII, upper). It is clear that the present form of the coastline is a resurrection of the physiographical conditions obtaining in Triassic times. Many aspects of the post-Old Red Sandstone cliffs are preserved beneath the Triassic sequence, which has been moulded over features as small and fragile as the protruding rock ribs on the Triassic shore (Plate VIII, lower).

The Triassic is typically represented by a completely unsorted fanglomerate which probably accumulated as a scree on mountain slopes adjacent to an interior basin. Cobbles and boulders up to 4 ft. long are the most common constituents; they are always angular with only a slight degree of rounding at corners, and are derived from the Old Red Sandstone and Carboniferous Limestone. Quartz pebbles in the Triassic conglomerate overlying the Woodhill Bay Conglomerate (Upper Old Red Sandstone) (Kellaway & Welch, 1955) were apparently derived from the latter unit. To the N.E. occasional red siltstone fragments from the Woodhill Bay Fish Bed of Upper Old Red Sandstone age (*op. cit.*) appear in the basal Triassic rocks. The conglomerate is generally restricted to the lowest part of the Triassic sequence where it is frequently 5-20 ft. thick. Although widespread along the entire strike of the division, it does not form a continuous sheet ; in many places the beds become extremely thin or give way entirely to medium-brown, fine- to medium-grained, calcareous pebbly sandstones which mainly display an indistinct bedding but are sometimes thinly laminated over short distances. Occasional boulders up to 1.5 ft. in diameter are sometimes scattered through the basal part of the sandy beds. Thinly-laminated, light-brown, sandy siltstones, a few inches thick, and occasionally with a ripple-marked upper surface, are in places found in the sandstones. Higher up, the sandstones often give way to red sandy siltstones which may be interbedded with fine-grained sandstones of the same colour.

An interesting deposit was found in a few places at the base of the sequence immediately below the lowest part of the conglomerate. It consists of orange-brown, fine-grained, moderately to highly calcareous sandstone, 1-3 in. thick, which probably represents a cemented beach sand. The band extends for only short distances





Upper: Steeply inclined contact of Triassic Dolomitic Conglomerate (left) on Lower Old Red Sandstone beds (right). Outcrop is located about 440 yds. south-west of Black Nore Point.

Lower: Moulded contact of Dolomitic Conglomerate on rock ribs formed on the underlying beds of the Lower Old Red Sandstone. Contact shown by pecked line. Hammer is 1 ft. long.

along the strike and its appearance probably marks the position of former pocket beaches and coves in the post-Old Red Sandstone lake shoreline.

STRUCTURE OF THE OLD RED SANDSTONE

The structure of the Clevedon-Portishead area has been described by Reynolds & Greenly (1924) who mentioned that the Old Red Sandstone of the coastal section forms part of the north-western limb of a major syncline but did not investigate the sequence in detail (Fig. 1). A number of post-Triassic faults were recognised by Wallis (1927) but their position, trend and amount of throw were not shown on a map. The Old Red Sandstone maintains a south-easterly dip of 15-35° over the whole section. Occasional steeper dips are usually found near faults and are attributable to drag.

Faults and Joints

The most important fault is located between Walton Bay and Charlcombe Bay where the upper part of the Upper Old Red Sandstone on the S.W. side of the break is in juxtaposition with the upper part of the Lower Old Red Sandstone to the N.E. The stratigraphical displacement is at least 250 ft. The fracture, which is concealed beneath the Dolomitic Conglomerate, is of pre-Triassic age. Its presence is indicated both by the lithological dissimilarities of the units on either side and by the pronounced steepening of dip and swing in strike of the adjacent beds; the latter phenomena suggest that the fault has a N.W. trend.

Other fractures, striking either N.W. or W.N.W., and bringing the Triassic and Old Red Sandstone into contact, appear mainly at the N.E. and S.W. ends of the section. The greatest amount of throw is shown by a fault at Ladye Bay where the stratigraphical displacement is at least 200 ft. The throws are, however, generally at most 20-30 ft. and are often less than 10 ft. Greater displacement is shown by a fault at Pigeon House Bay where the throw is 50-100 ft. On the southern side of Kilkenny Bay, a stratigraphical displacement of 36 ft. is well shown by the offsetting of the Woodhill Bay Conglomerate at the middle of its length of outcrop.

Except for the fracture between Walton Bay and Charlcombe Bay, all major faults affect the Dolomitic Conglomerate and therefore display post-Triassic movement. The downthrown side is generally to the south-west. Superficially, the faults appear to be tensional fractures of the normal type. Several faults, however, display sub-horizontal slickensides indicating lateral movement. They are particularly well shown on the plane of a small fault about 400 ft.

N.E. of Black Nore Point and on that of a subsidiary fracture in the zone displacing the Woodhill Bay Conglomerate, the lowest division of the Upper Old Red Sandstone. These faults appear to be of the dextral transcurrent type. Similar movement is indicated for the main fault displacing the Woodhill Bay Conglomerate at Woodhill Bay. The evidence here consists of dragged bedding planes in the sandstone-siltstone bands at the top of the Lower Old Red Sandstone beneath the conglomerate on the N.E. (upthrown) side of the fault where the conglomerate has been clearly displaced to the south-east. The bedding, however, shows pronounced downward drag, suggesting that two periods of faulting have taken place: first, pre-Triassic, in which there was dextral transcurrent movement and horizontal dragging of the beds; secondly, in post-Triassic times, the fracture was reactivated by normal faulting which accentuated the displacement of the units.

Similar complications are shown, 300 yds. N.E. along the section, by a fault bringing the Triassic against a thick sandstone unit of the Upper Old Red Sandstone, the throw being probably as much as 30 ft. At this locality, the basal Triassic cemented beach sand and the immediately overlying conglomerate are exposed at beach level where they display a down-dragged vertical attitude on the south-western (downthrown) side of the fault. The conglomerate is, however, also exposed in three large blocks immediately N.E. of the fault (that is, on the upthrown side). The blocks, which appear to be in place, are also at beach level and indicate that the Triassic beds have suffered a maximum displacement of only about 5 ft. This amount of throw cannot account for the relationship of the Old Red Sandstone and Triassic rocks since the latter are clearly in juxtaposition against the older beds for the entire height (20-30 ft.) of the outcrop. The distribution of the strata can be explained only by assuming pre-Triassic fault-movement which created a scarp, facing S.W., against which the Dolomitic Conglomerate was deposited. Post-Triassic renewal of fault movement caused a further 5 ft. of displacement accompanied by downward dragging of the relatively incompetent rocks above the unconformity. At many places the highly sheared nature of the Old Red Sandstone near fault contacts is inexplicable if the effects of only post-Triassic movement are considered ; an earlier, more intensive period of deformation is indicated.

Apart from the major faults already described, numerous minor fractures with throws limited to a few inches were observed especially in the section S.W. of Woodhill Bay. The fractures are mainly branching or *en échelon* faults which form small grabens; where they extend upwards into the Dolomitic Conglomerate they all display post-Triassic movement. North-east-trending faults are rare. The best example seen is in the cove at Walton Bay where Triassic beds display a minor graben. Three hundred yards S.W. of Woodhill Bay, an outcrop of cross-bedded sandstones on the tidal platform shows steepened, down-dragged bedding which is also suggestive of moderate faulting on a N.E. trend.

Many bedding planes in the Old Red Sandstone exhibit well developed slickensides which are parallel to the stratification. Their presence indicates that a considerable amount of bedding-plane slip has affected parts of the succession. Such movement would result in deformation of softer incompetent layers and may thus be the cause of the "brecciated" appearance of many siltstones in the lower part of the Old Red Sandstone sequence.

The Old Red Sandstone exhibits strongly developed joint patterns or sets, at least two of which also affect the Triassic strata. Joint trends are shown in Fig. 1 where they are seen to be parallel and transverse to the axes of the syncline to the S.E. and of a major anticline which probably lies to the N.W. The trend of the joints is thus parallel to that of the observed faults.

Three joint sets were found. **Set 1**, the most conspicuous and best developed, consists of vertical dip joints trending N.W. **Set 2** is composed of strike joints which trend N.E. and commonly dip N.W. at 60-70°. **Set 3** is poorly developed and was found mainly at the N.E. end of the section in the Woodhill Bay Fish Bed and the immediately overlying unit. These joints are generally vertical with an E.-W. trend ; they are sometimes prominent in thinly-laminated sandstones belonging to the lowest part of the Lower Old Red Sandstone where they have a N.W. dip of 60-70°. This set is mainly developed in beds which strike parallel to the cliff edge and is probably caused by rocks settling downhill in response to gravity; the joints therefore have no tectonic significance.

The distribution of joints is governed by the lithology and thickness of the beds. The joints are generally indistinct in the thicker siltstones where they frequently curve downwards to merge with the bedding. The thinner, brittle sandstones (0.5-6.0 in. thick) in the siltstone units display a close pattern, the most prominent set containing one joint to every 3-6 in. along the strike. Sandstones up to 2 ft. thick usually contain one joint to every 1-2 ft. and thicker layers display one to two per yard. Thick sandstone units exhibit at least one joint of the best developed set to every two yards. Although Set 1 is usually the best developed, Set 2 may be locally more conspicuous. At many places joints of both sets are filled by calcite which sometimes attains a thickness of 4 in. but is mainly 0.1-0.5 in. thick.

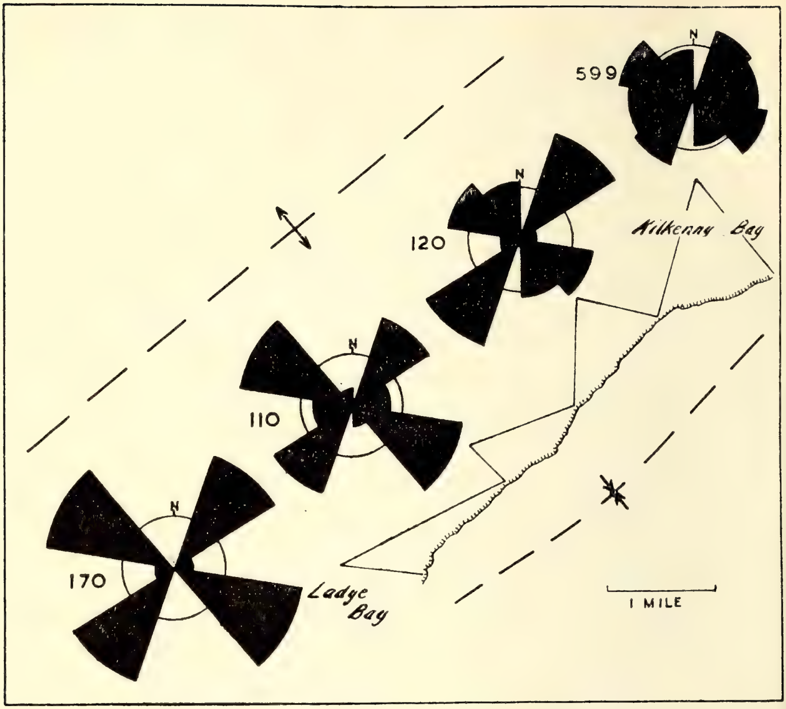


FIG. 1. *Rose-diagrams showing joint-set trends in the Portishead coastal section.*

The section, which is shown by the outline of the coastal cliffs, is divided into four equal lengths, numerals indicating the number of readings within each sector. Observations are grouped in 40° classes. The circle accompanying each diagram marks the 20% frequency level. Major fold axes are shown to the N.W. and S.E. of the section.

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BRYOPHYTES OF LEIGH WOODS, SOMERSET

By A. J. Willis

(Department of Botany, University of Bristol)

THE Avon Gorge has long been celebrated for its array of rare plants, but the bryophyte flora has received relatively little attention. The rare flowering plants are most frequent on the Gloucestershire side of the Gorge, but many of them also occur in Leigh Woods on the Somerset side of the river Avon. Here the rock outcrops are less extensive, the slopes usually not so steep, the soil deeper and the tree cover considerable and of very long standing.

An opportunity to compile a list of the liverworts and mosses of Leigh Woods was provided by a visit of the British Bryological Society there on 27 October, 1963. The records, although not exhaustive, were made as complete as possible for the particular parts of the woods visited (National Grid Ref. ST/5674). Altogether over 110 bryophytes were seen, this large number probably reflecting the wide range of environmental conditions existing.

In the shaded Nightingale Valley the chief habitats are the rocky outcrops and the soil of the woodland floor; epiphytes on the trees and dead wood are also of interest. The towpath provides a narrow open belt adjoining the river, and has a characteristic bryophyte population which probably receives appreciable quantities of salt. The six quarries which adjoin the towpath were examined closely on the B.B.S. visit and yielded several notable records. A map showing the position and extent of these quarries is given in the classic account of the geology of the Avon Gorge by Vaughan, revised by Reynolds (1936).

The nomenclature of liverworts in this report follows that of Jones (1958) and of mosses that of Warburg (1963).

As will be seen from the following lists, many of the bryophytes are those to be expected in an area where the rock is of Carboniferous limestone and the soil calcareous. However, a few of the liverworts present, e.g. *Calypogeia fissa*, *Diplophyllum albicans*, *Lepidozia reptans*, *Solenostoma crenulatum*, are usually regarded as calcifuge; the distribution of these forms is restricted in Leigh Woods, and probably depends largely on surface leaching.

In the lists for Nightingale Valley the bryophytes are recorded for their most characteristic habitat; some species given for soil and rock areas may also occur, for example, on bark at the base of trees. A few old dead tree trunks in the valley were especially rich in epiphytes; on one trunk were *Ptilidium pulcherrimum*, *Nowellia curvifolia* and *Dicranum montanum*, the last a new record for vice-county 6. The living trees do not, however, support a very extensive growth of epiphytes.

The rock and soil surfaces bear a considerable variety of bryophytes which occasionally form a moderately thick carpet, especially in the lower, damper parts of the valley. Here, as well as in some of the quarries, *Fissidens minutulus* var. *tenuifolius* occurs (new v.c. record) on rock fragments.

NIGHTINGALE VALLEY

On soil and rock

Calypogeia fissa
Chiloscyphus polyanthos var. polyanthos
Leiocolea turbinata
Lejeunea cavifolia
Lophocolea bidentata
L. cuspidata
Lunularia cruciata
Pellia fabbroniana
Plagiochila asplenioides var. asplenioides
P. asplenioides var. major
Porella platyphylla
Acrocladium cuspidatum
Atrichum undulatum
Barbula recurvirostra
Brachythecium populeum
B. rutabulum
Bryum capillare
Camptothecium sericeum
Cirriphyllum crassinervium
Ctenidium molluscum var. molluscum
Dicranum scoparium
Eurhynchium confertum
E. praelongum var. praelongum
E. praelongum var. stokesii
E. striatum
E. swartzii
Fissidens cristatus
F. minutulus var. tenuifolius
F. taxifolius
Isopterygium depressum
Isothecium myurum
I. striatulum
Mnium hornum
M. punctatum
M. stellare
M. undulatum
Neckera crispa
Plagiothecium sylvaticum
Rhynchostegiella pumila
R. tenella var. tenella
Thamnium alopecurum
Thuidium tamariscinum
Tortella tortuosa
Trichostomum brachydontium

On trees and dead wood

Cephalozia bicuspidata var. bicuspidata
Lophocolea heterophylla
Metzgeria furcata
Nowellia curvifolia
Ptilidium pulcherrimum
Amblystegium serpens
Anomodon viticulosus
Dicranoweisia cirrata
Dicranum montanum
Hypnum cupressiforme var. cupressiforme
Isothecium myosuroides
Tetraphis pellucida

On the more open parts of the towpath the most abundant mosses are small acrocarpous forms. *Bryum argenteum* and *Barbula convoluta* are frequent, together with other species of *Barbula* of more sporadic occurrence.

TOWPATH AREA

Solenostoma crenulatum
Barbula convoluta var. convoluta
B. fallax
B. hornschuchiana
B. trifaria
B. unguiculata
Brachythecium albicans
Bryum argenteum var. argenteum
B. argenteum var. lanatum
B. pseudotriquetrum
Campylium polygamum
Dicranella varia
Drepanocladus aduncus
Encalypta vulgaris
Tortula ruralis
T. subulata
Trichostomum crispulum

On walls adjoining towpath

Barbula convoluta var. commutata
B. rigidula
Brachythecium glareosum
Bryum caespiticium
Rhynchostegiella pumila

The quarries, now long disused, support many of the species characteristic of the wooded areas, as well as some typical of rock and soil surfaces. Several quarries contain a substantial growth of young trees which form fairly dense thickets, but in other areas there are exposed rock faces, boulders and screes. Further, on the floors of the quarries some soil formation has taken place. Consequently the quarries themselves present contrasted habitats.

The following list excludes very common bryophytes already noted, but gives the numbers of the quarries (according to the sequence in the paper by Vaughan & Reynolds, 1936), in parentheses, where the less widespread species occur.

QUARRIES

Frullania dilatata
Lepidozia reptans
Metzgeria furcata
Riccardia pinguis
Scapania aspera (4, 6)
Solenostoma crenulatum
S. triste
Acrocladium cuspidatum
Aloina ambigua
Amblystegiella confervoides
Amblystegium serpens
Barbula convoluta
B. fallax
B. recurvirostra
B. revoluta
B. rigidula
B. tophacea
B. trifaria
Bryum capillare
B. donianum (4)
B. inclinatum
B. pallens (2, 3, 5)
B. pseudotriquetrum
B radiculosum (2, 4)
Camptothecium lutescens
Campylium protensum (3)
Ceratodon purpureus var purpureus
Cirriphyllum crassinervium
C. piliferum
Climacium dendroides (2)
Cratoneuron filicinum
Dicranella heteromalla
D. varia
Distichium capillaceum (4)
Ditrichum flexicaule
Encalypta streptocarpa
E. vulgaris
Eurhynchium murale
Fissidens cristatus
F. incurvus
F. minutulus var. tenuifolius
F. viridulus
Funaria hygrometrica
Grimmia apocarpa
G. orbicularis (5)
G. pulvinata
Gymnostomum calcareum (2)
Hypnum cupressiforme var. resupinatum
H. cupressiforme var. tectorum

Isopterygium depressum
Mnium longirostrum (3, 6)
M. punctatum
Neckera complanata
Pottia bryoides (3)
Tortella tortuosa
Tortula muralis (inc. var. rupestris)
Trichostomum brachydontium var. brachydontium
T. crispulum
Zygodon viridissimus var. viridissimus

A survey of other parts of the area, such as the plateau woodland, would yield further records. For reference, species noted by Watson (1912, 1920) for Leigh Woods, but not already listed in this paper are given below.

Calypogeia arguta
Cephaloziella starkei
Chiloscyphus pallescens
Barbula cylindrica
Brachythecium plumosum
Campylium chrysophyllum
C. stellatum
Funaria obtusa
Hylocomium brevirostre
Hypnum lindbergii
Leucobryum glaucum
Mnium cuspidatum
M. pseudopunctatum
Omalia trichomanoides
Pleuridium subulatum
Pottia lanceolata
P. truncata
Rhacomitrium canescens
R. lanuginosum
Tortella nitida
Weissia controversa
W. crispa
W. tortilis

Less common bryophytes, also known to occur in Leigh Woods, include:

Cololejeunea rosettiana
Lejeunea ulicina
Marchesinia mackaii
Ditrichum cylindricum
Eucladium verticillatum
Fissidens bambergeri
Funaria muhlenbergii
Scorpiurium circinatum
Seligeria doniana

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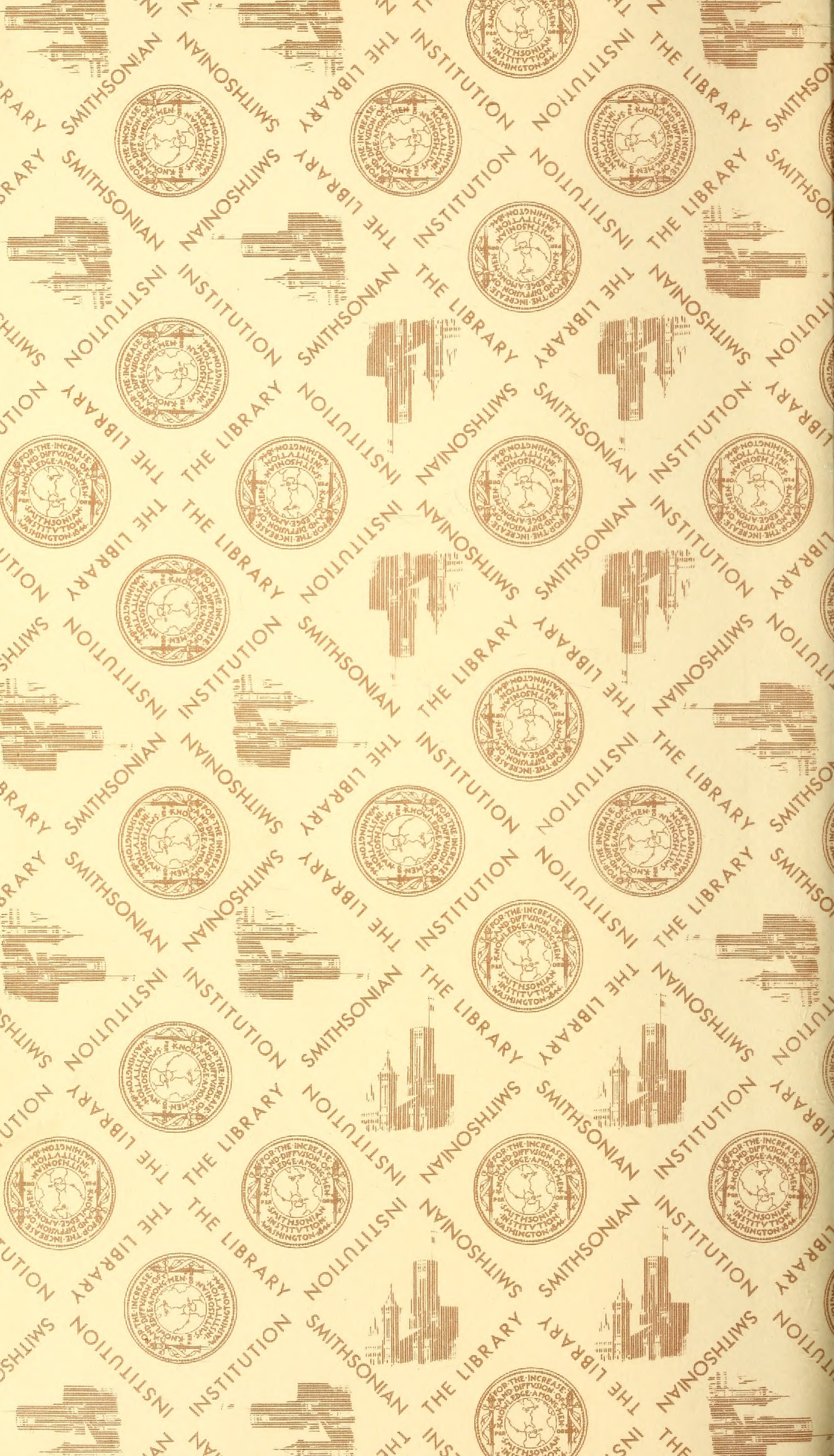
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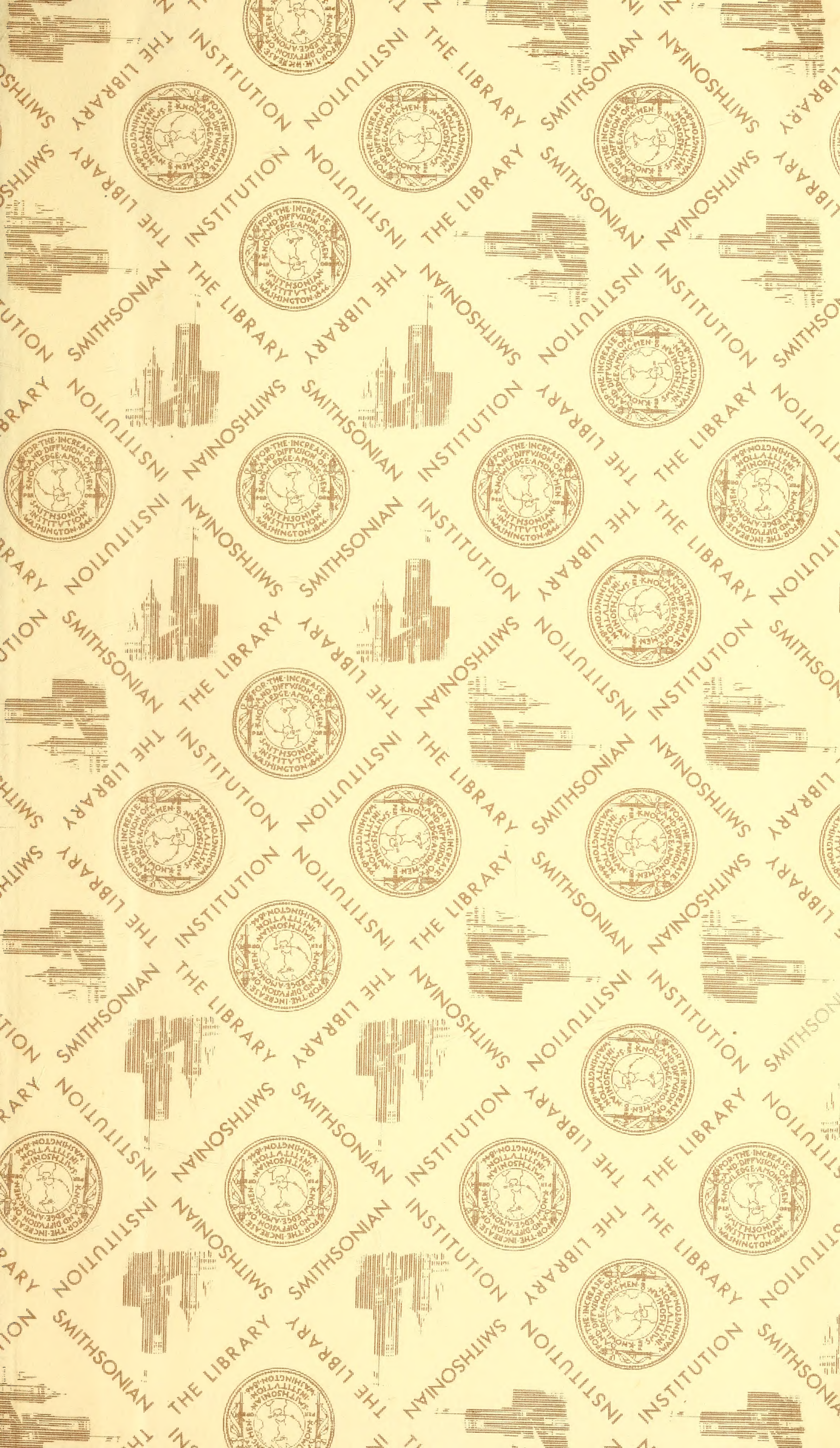
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